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FINAL
SITE INVESTIGATION
I-70 PHASE II AND III CONSTRUCTION
44TH STREET TO BRIGHTON BOULEVARD, CITY AND COUNTY OF DENVER, COLORADO

July 23, 1998
CDOT Project No. IR-IM(CX)070-4(145)

Walsh

Environmental Scientists and Engineers, Inc.

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Established 1979

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Prepared for:

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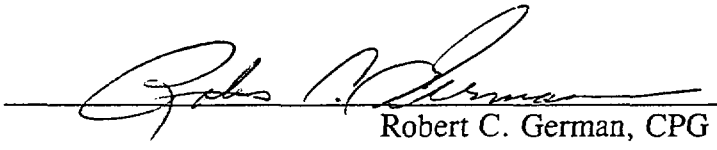

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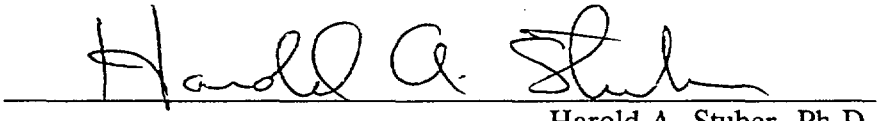

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WALSH Project Number 3008-020

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EXECUTIVE SUMMARY

Walsh Environmental Scientists and Engineers, Inc. (WALSH) was contracted by the Colorado Department of Transportation (CDOT) to conduct a Site Investigation (SI) of properties involved with the Phase II and III construction activities along I-70 from 44th Street to Brighton Boulevard in Denver, Colorado (CDOT Project No. IR-IM(CX)070-4(145)).

The proposed construction activities include: replacement of the elevated portions of I-70 from Washington Street to Brighton Boulevard with a wider, elevated highway. Existing ramps at Humboldt Street will be removed and replaced with interchanges constructed at Washington Street and Brighton Boulevard. The existing elevated structure east of Humboldt Street will be replaced, and fill material will be used to support I-70 east of Humboldt Street. Brighton Boulevard and 44th street will be widened and the UPRR tracks relocated to the south. Construction of retaining walls, caissons, storm/sanitary sewers, and other utility relocations will require excavation at various locations in the project area. Ground water is found at depths greater than 27 feet; most excavations will not require dewatering.

Previous environmental investigations identified several areas of concern, including: soil contamination from leaking USTs at one property near East 46th Avenue and Brighton Boulevard and two properties near East 46th Avenue and 44th Street; possible soil contamination by heavy metals from smelter wastes near Humboldt Street and tannery wastes near Brighton Boulevard; possible ground water contamination from leaking USTs and smelter wastes; and chlorinated solvents in the ground water above MCLs near East 46th Avenue and 44th Street.

The major conclusions of this investigation are stated below. Environmental conditions of individual parcels are discussed in the text and environmental concerns are depicted in Figure 6.

- Ground water from all of the test holes drilled in 1998 in the Phase II and III construction areas is contaminated with PCE, and in places with methylene chloride, at concentrations which exceed the MCLs for these compounds. The greatest concentration of PCE was detected in TH-24 (530 ug/L) on Parcel 99. Substantial PCE was also detected in TH-19 on Parcel 49 (140 ug/L). Methylene chloride above the MCL was detected on Parcel 49 and Parcel 67 (in 1991). PCE contamination was widespread in 1991, but only exceeded the MCL in one location (TH-09, 6 ug/L). Either multiple sources of contamination exist within the study area, or a large plume of PCE has migrated into the area from unknown up-gradient location(s).

- Black fill material containing elevated concentrations of lead and arsenic, presumably composed in part of smelter wastes from the Omaha and Grant Smelter, was discovered near the southeast corner of Parcel 49 (Central Storage). This fill material was also contaminated with petroleum compounds. Discolored fill material containing metals, PAHs and oil was previously detected on Parcel 43 (Darko's Automotive) and Parcel 46 (Hydraulic Equipment Repair). This material is a special and not a hazardous waste.

- Fuel contamination of soils is widespread, but at levels which do not exceed RAC I remediation levels. Volatile petroleum compounds were found in the ground water from TH-24 (Parcel 99, Lambert storage building), TH-10 (Parcel 42, O G Valentine Lumber) and TH-16 (Parcel 49, Central Storage). This contamination is often related to leaking USTs.

- WALSH recommends that soils with visible petroleum contamination, that exhibit headspace PID readings or have a hydrocarbon odor should be segregated, (petroleum contaminated and metal-contaminated segregated separately), placed on plastic, bermed and covered with plastic pending analysis and proper disposal. Dust suppression methods and proper PPE (gloves) should be employed to reduce worker exposure and limit the spread of the contaminated soil.

- WALSH recommends that ground water removed from deep excavations be treated to remove petroleum and chlorinated hydrocarbons prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

- An underground storage tank on Parcel 42 (O G Valentine Lumber) may be contributing to the contamination noted on Parcels 42 and 79. USTs may also be present up-gradient to Parcel 50 (Western Boom), Parcel 54 (Lambert Auto Parts), Parcel 55 (Lambert Automobile Electronics), and Parcel 46 (Hydraulic Equipment Repair). Known USTs are present on Parcel 55 (Lambert Automobile Electronics). Construction personnel may uncover USTs and contamination during demolition activities.

- Discharge parameter results indicate that ground water will exceed allowable limits for total suspended solids (TSS). Settling or flocculation will be required to remove excessive TSS. Total dissolved metals in ground water was within MCLs. Treatment or a permit variance will also be necessary for the elevated gross alpha and beta radiation. The radiation values are not unusual for sites along the Front Range.

- Ground water flow direction in the Phase II and III construction areas is to the northwest, that is, towards the South Platte River. Depth to ground water is generally between 27 and 31 feet over most of the investigation area.

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1 Introduction

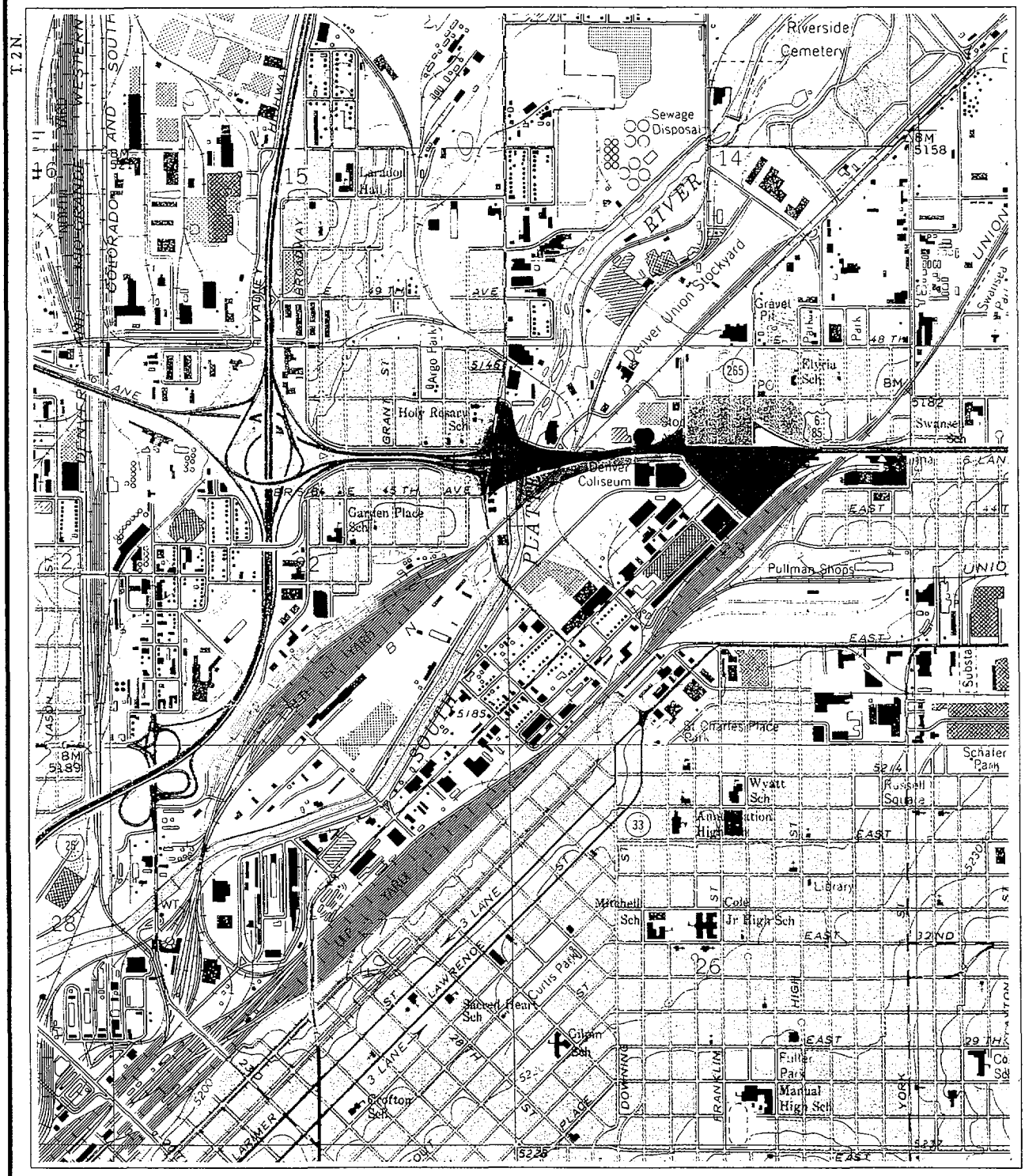
Walsh Environmental Scientists and Engineers, Inc. (WALSH) was contracted by the Colorado Department of Transportation (CDOT) to conduct a Site Investigation (SI) of properties involved with the Phase II and III construction activities along I-70 from Humboldt and 44th Streets to Brighton Boulevard (Figure 1) in Denver, Colorado (CDOT Project No. IR-IM(CX)070-4(145)). The purpose of this study was to investigate some of the environmental concerns identified in earlier studies of the I-70 corridor from Washington Street to Brighton Boulevard (WALSH, 1991a, 1991b, 1992, and 1996; Aguirre, 1995).

The objectives of this Site Investigation include the identification of potential environmental liabilities prior to property acquisition, and identification of areas where special handling and disposal may be required for excavated soil, or where construction activities may encounter contaminated ground water. Test holes and shallow soil borings were drilled to the depth of excavations anticipated during the construction and pipe-laying activities. Construction worker and public health and safety issues identified by this investigation are discussed and a Materials Management Plan (MMP) is being submitted.

2 Proposed Construction and Property Acquisition

The CDOT plans to replace the elevated portion of I-70 from Washington Street to Brighton Boulevard with a wider, elevated highway (see Figure 2). Existing ramps at Humboldt Street will be removed and replaced with interchanges constructed at North Washington Street and Brighton Boulevard. The existing elevated structure east of Humboldt Street will be replaced, and fill material will be used to support I-70 east of Humboldt Street. A pedestrian underpass is proposed to connect the Denver Coliseum and National Western Stock Show buildings. This underpass will be constructed beneath the present East 46th Avenue (Figure 2).

Preliminary design plans indicate that property acquisition will be required for the widening of I-70, the relocations of East 46th Avenue and Brighton Boulevard. The Union Pacific Railroad (UPRR) tracks (south of I-70 at Brighton Boulevard) will be moved southward to accommodate proposed ramp structures. Construction of the Denver Coliseum/National Western Stock Show pedestrian underpass, retaining walls, caissons, storm/sanitary sewers, and other utility relocations will require excavation at various locations in the project area.



Approximate Map Scale: 1: 24 000

Map Source: USGS Commerce Quadrangle
Colorado, 7.5 Min. Series (topographic) 1959
Photorevised 1980

Blue = Phase I
Green = Phase II
Yellow = Phase III

N

Walsh
Environmental Scientists and Engineers, Inc.

Vicinity Map

Job 3008-020	Date 4/98	Figure 1

vmap.CDR 4/24/98 PB

3 Regional Setting

3.1 Location

The area investigated is located within the City and County of Denver, Colorado and is shown in Figure 1. Properties sampled in this investigation are located along East 46th Avenue and Brighton Boulevard and centered on I-70. The initial phase of the construction will involve the widening of the eastbound lanes of I-70 from Washington Street to Humboldt Street. This work is in progress. East of Humboldt Street, construction activities will extend ramps away from I-70 and into existing neighborhoods and commercial areas approximately bounded by 44th Street and Brighton Boulevard on the south and East 47th Avenue on the north. Phase II construction involves the widening of Brighton Boulevard and 44th Street and the associated I-70 access and exit ramps. The relocation of the UPRR tracks and the construction of the Denver Coliseum pedestrian underpass will also be completed during this phase. Phase III construction will involve the construction of the access and exit ramps for the west-bound lane of I-70, widening of Brighton Boulevard north of I-70, and the relocation of East 46th Avenue through the residential and commercial area north of I-70.

3.2 Physiography and Geology

The project area is located in the Denver Basin, east of the Front Range Uplift of the Southern Rocky Mountains. Topographically the area is generally flat with elevations decreasing towards the South Platte River (Figure 1). Surface drainage is towards the South Platte River. The project area is covered by a thin veneer of unconsolidated sediments which include the Broadway Alluvium (Quaternary) and the Post Piney Creek Alluvium (Holocene). These sediments are generally poorly sorted sands, gravels and some clays. Flat lying bedrock of the Cretaceous/Tertiary Denver Formation, consisting of weathered shale, siltstone, and fine sandstone, is unconformably overlain by the younger unconsolidated sediments. Depth to the undulatory bedrock surface under the eastbound lane of I-70 is approximately 40 feet (Aguirre, 1995).

Extensive areas of fill have been documented on the grounds of the Denver Coliseum (WALSH, 1991a, 1991b, 1997), immediately west of the Phase II and III construction area. The area now covered by the paved parking lots of the Coliseum was once the site of an extensive sand and gravel quarry which was subsequently filled with smelter slag and waste rock, and demolition debris from the Omaha and Grant Smelter. In addition, the gravel pit depressions were filled with domestic trash before the area was cleared for parking areas in the late 1940s.

Approximately 5 to 15 feet of fill material has been documented under the east-bound lane of I-70 (WALSH, 1992 and Aguirre, 1995). Lesser amounts of fill (0 to 5 feet) have been found in the Phase II and III construction areas. No smelter waste has been identified in this area.

The top of the Denver Formation marks the base of the unconfined aquifer. Depth to ground water is expected to be approximately 27 to 30 feet below ground surface in the vicinity of the Phase II and III construction (Figure 4). Local unconfined ground water flow, east of the South Platte River is to the northwest (WALSH, 1991b and Figure 3, this report). Ground water flow velocities were estimated to vary between 20 and 200 feet per year within the study area (WALSH, 1996). More details of the local geology and ground water conditions are found in the various WALSH reports (1991a, 1991b, 1992, 1996,and 1997) and the geotechnical report by Aguirre (1995).

4 Review of Earlier Environmental Investigations

Phase II and III of the modifications to I-70 between Humboldt/44th Streets and Brighton Boulevard traverse a commercial, industrial and residential area where several environmental concerns have been identified. Properties of concern were identified along East 46th Avenue and Brighton Boulevard in 1991 (WALSH, 1991b), including eleven properties with known USTs. This study was expanded in July 1991 (WALSH. 1992) to include the I-70 corridor from North Washington Street to Brighton Boulevard and was revised in late 1996 (WALSH, 1996). These reports identified four main categories of environmental concern: petroleum contaminated soils and ground water from leaking USTs; possible soil and ground water contamination from tannery operations; soil contaminated with smelter wastes or other materials resulting in elevated heavy metal content; and ground water contaminated with low concentrations of chlorinated hydrocarbons.

This investigation evaluated the degree of contamination on properties scheduled for acquisition by the CDOT, in areas that will be excavated for the relocation of utilities, the UPRR tracks, the Denver Coliseum pedestrian underpass, and for the construction of the relocated East 46th Avenue and the I-70 exit and access ramps.

5 Environmental Concerns and Areas of Investigation

The following parcels between Humboldt/44th Streets and Brighton Boulevard were selected for additional investigation of environmental concerns during Phase II and III of the construction activities along the I-70 corridor, including:

- Parcel 50 (4415 Brighton Boulevard, Western Boom), acquired for the widening of Brighton Boulevard and 44th Street and the relocation of the UPRR tracks;

- Parcel 49 (4400-4500 Brighton Boulevard, Central Storage), also acquired for the widening of Brighton Boulevard and the relocation of the UPRR tracks;

- Parcel 42 (1610 East 46th Avenue, O G Valentine Lumber), acquired for the widening of east-bound I-70 and the installation of a sewer line across the southern boundary of the property; and,

- Parcels 43 (1633 East 46th Avenue, Darko's Automotive), 54 (4605 Brighton Boulevard, Lambert Auto Parts), 55 (4615 Brighton Boulevard, Lambert Auto Electric), 56 (4637 Brighton Boulevard, Lambert parking lot) and 99 (4614 Baldwin Court, Lambert storage building); to be acquired for sewer line excavations, the widening of Brighton Boulevard, and the construction of an access ramp to westbound I-70.

CDOT also requested that soil samples be collected from of a portion of East 46th Avenue between the Denver Coliseum and the National Western Stock Show buildings. This area is the proposed location of a pedestrian underpass to connect the two facilities.

6 Summary of Investigation Activities

Test Holes Phase II Construction Area
Two soil borings were drilled along Brighton Boulevard, adjacent to Parcel 49 (4400-4500 Brighton Boulevard, Central Storage), along the path of the UPRR track relocation and immediately down-gradient from the Central Storage building which was formerly a tanning operation or abattoir.

Two soil borings were also drilled on Parcel 50 (4415 Brighton Boulevard, Western Boom). These test holes were place to document the extent of suspected soil and ground water contamination from USTs and ASTs which once existed at the site.

One test hole was drilled on Parcel 42 (1610 East 46th Avenue, O G Valentine Lumber) along the route of a proposed storm sewer.

Shallow Geoprobe™ Soil Samples
Geoprobe™ soil borings to 10 feet (3.1 meters) total depth were drilled at three sites along the southeast side of Parcel 49 (Central Storage, 4400-4500 Brighton Boulevard). The position of the three Geoprobe™ holes was selected to investigate the presence of possible soil contamination from heavy metals from tannery operations at the site or from possible use of smelter wastes as fill material. The Central Storage structure will be demolished to allow the relocation of the UPRR tracks and the widening of Brighton Boulevard.

One Geoprobe™ soil boring was drilled in the median of East 46th Avenue along the proposed path of the Denver Coliseum/National Western Stock Show pedestrian underpass. This boring was advanced to 10 feet total depth and was placed to investigate the presence of heavy metals in soils associated with the use of smelter waste as fill material. The locations of the Geoprobe™ soil borings are shown on Figure 2.

Test Holes Phase III Construction Area

One test hole was drilled on Parcel 99 (4614 Baldwin Court, Lambert storage building) to document suspected soil contamination at the site of a former automobile repair garage. This property is along the path of the proposed westbound I-70 onramp.

One test hole was drilled on Parcel 55 (4615 Brighton Boulevard, Lambert Auto Electric) along the path of a proposed sewer line and down-gradient from a former(?) UST.

Test holes were drilled to below the anticipated depth of excavation or to a maximum depth of 40 feet (12.2 meters). All test holes were completed as monitoring wells. Test holes were monitored during drilling for both combustible gases and VOCs using a calibrated GasTech Model 1314 combustible gas indicator (CGI) and a calibrated HNu Model 101 photoionization detector (PID). Sample headspace measurements were taken using the PID to field screen for VOCs. Soil samples were also field screened for elevated concentrations of radioactive elements using a radiation detector. Soil and ground water samples from soil borings and monitor wells were analyzed according to the sampling and analysis plans (WALSH, 1998a, b). The location of the test holes is shown on Figure 2.

7 Sampling Methodologies

7.1 Boring Methodology and Soil Sampling

Test holes were drilled with a CME-55 truck-mounted drill rig using seven-inch hollow stem continuous fight augers with an internal diameter of 3.25 inches. Soil samples from all test holes were collected at a maximum interval of 5 feet beginning at the surface using a 24-inch stainless-steel split spoon sampler.

Discrete or composited soil samples were sent to the laboratory, depending on field observations. If field screening instruments did not indicate contaminants and visual/olfactory indications of contamination were absent, a soil sample was collected above the ground water/capillary zone for laboratory analyses. In most cases a shallow soil sample was also collected. At least one sample per borehole was collected. All samples were collected in glass jars with Teflon-lined lids. The samples were kept on ice at 4 degrees Celsius (4° C) in coolers for delivery to the laboratory. Chain-of-custody records were completed for each sample (see Appendix 7.0). Complete logs were prepared for all test holes and are presented in Appendices 3.0 and 4.0.

Shallow soil samples from Parcel 49 and East 46th Avenue were obtained with a Geoprobe™ truck-mounted sampling device using 4-foot long, 1.5-inch diameter stainless steel sampling tubes. The sampling tube was lined with a polybutyrate plastic sleeve which allowed extraction of an undisturbed sediment sample.

7.2 Geoprobe™ Soil Sample Locations

The locations of the Geoprobe™ soil sampling sites and the test holes are shown on Figure 2. This figure also shows the projected path of the major utilities which will be relocated during Phase II and III of the modifications of I-70 near Brighton Boulevard. Also shown on this figure are the locations of test holes and soil borings drilled for earlier environmental and geotechnical investigations.

7.3 Piezometer Installation and Ground Water Sampling

Ground water was sampled through factory-slotted (screened) PVC pipe inserted in the test holes. Screened PVC sections were installed from total depth to at least 2 feet above the static water table. Solid 2-inch PVC sections with a locking cap were used to extend the screened interval to the surface. Silica sand was poured around the PVC to approximately 2 feet above the screen and bentonite chips added from the sand to approximately 1.5 feet below the surface to seal the annular space. Concrete was used to secure a limited access, flush-mount protective well cover.

Monitor wells were developed by purging a minimum of 10 casing volumes of water. Prior to sample collection, the well head space was measured for VOCs using a PID and an additional three casing volumes of water were purged. The standing water was field tested during bailing for pH, conductivity and temperature. The stability of these measurements and the total volume of water purged assured that the ground water sample was representative of the formation. Ground water sampling forms were completed for each test hole and are presented in Appendix 3.0.

Ground water samples were retrieved with a disposable polyethylene bailer and were collected for analysis as follows: two 40-milliliter (ml) vials for VOCs and TVPH; one 1-L polyethylene bottle for metals (field filtered); and 1-L amber glass bottle for TEPH. The samples were placed immediately in an ice-filled cooler to maintain a temperature of 4° C, and delivered to the laboratory with complete chain-of-custody records (see Appendix 7.0).

7.4 Surveying

The ground level and casing elevations of the newly installed piezometers were recorded by global positioning system (GPS) using the dual frequency method, as specified in the contract with CDOT. The location and surface elevations of the other test holes and shallow soil borings were also recorded by the GPS system. The surveying was conducted by Drexel Barrell & Company of Boulder, Colorado. The survey results are presented in Appendix 2.0.

8 Laboratory Analyses

Based on field observations and field screening measurements, selected soil samples from the parcels to be acquired during the Phase II and III construction activities were analyzed for Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX) and Tert-butyl Methyl Ether (MTBE) by EPA Method 8020, VOCs by EPA Method 8260, TEPH by Method 8100, and total RCRA metals by EPA Method 6020A. Selected soil samples were also analyzed for SVOCs by EPA Method 8270. When high concentrations of one of the eight RCRA metals were detected in a sample, that sample was also to be analyzed for TCLP metals to determine if the sample exceeds RCRA standards and would be classified as a hazardous waste. Soil sample preservation procedures are included in Table 1 and the complete analytical results are presented in Appendix 5.0.

Table 1 Soil Sample Methods, Containers and Preservatives

Analysis and Method	Container	Preservative
TEPH, EPA 8015	1-4 or 8 oz glass	Cool
TVPH, EPA 8015	1-4 oz glass	Zero headspace, Cool
BTEX/MTBE, EPA 8020	1-4 oz glass	Zero headspace, Cool
VOAs, EPA 8260	1-4 oz glass	Zero headspace, Cool
SVOAs, EPA 8270	1-4 oz glass	Cool
RCRA 8 Metals, EPA 7000 et. Seq., 6020 or ICP	1-8 oz. glass	None (Cool)
TCLP Non-volatiles	1-8 oz glass	Cool

TEPH = Total Extractable Petroleum Hydrocarbons
RCRA = Resource Conservation and Recovery Act
SVOAs = Semi-volatile Organic Compounds
TVPH = Total Volatile Petroleum Hydrocarbons
TCLP = Toxicity Characteristic Leaching Procedure
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
VOAs = Volatile Organic Compounds

Table 2 Water Sample Methods, Containers and Preservatives

Analysis and Method	Container	Preservative
TEPH, EPA 8015	1-1L glass or nalgene	HCl, pH < 2, Cool
TVPH, EPA 8015	2-40 ml VOA vials	HCl, pH < 2, Cool
BTEX/MTBE, EPA 8020	2-40 ml VOA vials	HCl, pH < 2, Cool
VOAs, EPA 8260	2-40 ml VOA vials	HCl, pH < 2, Cool
SVOAs, EPA 8270	1-1L amber glass	Cool
Total RCRA Metals, EPA 7000 et Seq., 6020 or ICP	1-1L HDPE	Field filtered, HNO_3, pH < 2, Cool
pH, probe Alkalinity, EPA 310.1 TSS, EPA 160.2 TDS, EPA 160.1	1-1L HDPE	Cool
COD, EPA 410.1	1-250 ml HDPE	H_2SO_4, pH < 2, Cool
Oil and Grease, EPA 413.1	2-1L amber glass	H_2SO_4, pH < 2, Cool
Gross Alpha and Beta Radioactivity, SW 9310	1-1L HDPE	HNO_3, pH < 2, Cool

TEPH = Total Extractable Petroleum Hydrocarbons
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
COD = Chemical Oxygen Demand
TDS = Total Dissolved Solids
SVOAs = Semi-volatile Organic Compounds
TVPH = Total Volatile Petroleum Hydrocarbons
RCRA = Resource Conservation and Recovery Act
TSS = Total Suspended Solids
VOAs = Volatile Organic Compounds

Ground water samples from previously existing monitoring wells (TH-10, TH-16, and TH-18) were analyzed for Total Extractable Petroleum Hydrocarbons (TEPH) by EPA Method 8100, and Total Volatile Petroleum Hydrocarbons (TVPH) by EPA Method 8015. Ground water from the newly-drilled monitor wells was tested for TEPH, TVPH, and Total Dissolved RCRA Metals by EPA Method 6020A. Ground water from six of the seven new wells was also tested for Volatile Organic Compounds (VOCs) by EPA Method 8260. No discharge parameter data was collected from this round of sampling because existing data was deemed adequate. The existing discharge parameter data collected in 1991 is presented in Appendix 6.0. The complete analytical results are collected in Appendix 5.0. Ground water sample preservation procedures are included in Table 2.

9 Results

9.1 Geology

9.1.1 Parcel 49 (Central Storage)

Two test holes were drilled along the northwestern side of the Central Storage Building at 4400 to 4500 Brighton Boulevard along the path of the proposed widening of Brighton Boulevard and at the proposed intersection of the UPRR tracks and Brighton Boulevard (TH-19). Three Geoprobe test holes (GP1 to GP3) were drilled in the concrete-covered parking area along the southeastern side of the structure. Field logs describing the sediments encountered are in Appendix 3.0 and graphic logs of the test holes and Geoprobe^{TM} soil sampling sites are in Appendix 4.0.

Test hole **TH-19** was drilled approximately 342 feet from the intersection of 44th Street and Brighton Boulevard and 4.5 feet from the Central Storage building foundation. This test hole is in the path of the proposed expansion of Brighton Boulevard and at the proposed intersection of the relocated UPRR tracks and Brighton Boulevard. Maximum depth of excavation in this area is unknown, but demolition of the Central Storage structure and installation of utilities could require excavations to at least 10 feet. TH-19 was sampled to 31.5 feet and completed at 35 feet total depth. Ground water was encountered at approximately 30 feet below ground surface. Bedrock was not penetrated. The test hole penetrated about 16.5 feet of fine to coarse sand (coarsening downwards) resting on 1.5 feet of moist, plastic clay. The clay overlaid 18.5 feet of coarse sand and gravel. This sand and gravel was very loose which prevented sampling below 35 feet at this location. Dark brown to black staining was noted in the samples from 6 to 6.3 feet. This staining was not accompanied by PID headspace readings or odor. No explosive gases or abnormal radiation was detected.

Test hole **TH-20** was also drilled in the path of the proposed Brighton Boulevard expansion and adjacent to the Central Storage structure. This test hole was drilled approximately 157 feet

from the intersection of 44th Street and Brighton Boulevard and 4.5 feet from the building. This test hole encountered a similar stratigraphic sequence as seen in TH-19. The fine to coarse grained, coarsening downward sand from near the surface to 15.5 feet exhibited no staining or odor, although low levels of VOCs were detected in headspace samples at 10 to 11.5 feet (1.4 ppm) and 15 to 16.5 feet (23 ppm). The sand was wet immediately above a thin clay layer from 15.5 to 16.0 feet, but was dry in the samples at 20 feet. There may be a very thin perched water table of limited areal extent in the vicinity of this test hole. Coarse sand with gravel (to 1 inch diameter) was encountered beneath the clay layer to the total depth of 36.5 feet (completed to 35.0 feet). Headspace VOCs were also detected in the samples from 25 to 26.5 feet (6.5 ppm, no odors or staining). Black staining and faint hydrocarbon odors (but no headspace VOCs) were noted in the samples from 35.0 to 36.0 feet. Ground water was measured at approximately 30 feet below the surface.

TH-16 was drilled in 1991 by WALSH near the northern apex of Parcel 49. This test hole encountered fill from near the surface to about 3 feet, followed by 6 feet of clayey sand over 36 feet of gravelly sand. Total depth was 45 feet and bedrock was not encountered. Ground water was measured at 30.36 feet below ground level on May 26, 1998. No staining, odors, explosive gases, headspace VOCs, or abnormal radiation was detected in this boring.

TH-15 (WALSH 1991) was drilled 213 feet northeast of TH-16 and approximately 43 feet north of the Parcel 49 property line. This well penetrated sands and gravels from the surface to bedrock at 41.5 feet. Bedrock consisted of blue-gray claystone. Ground water was encountered at approximately 28 feet below the surface. No staining, odors, headspace VOCs, explosive gases, or abnormal radiation was detected in the samples from this test hole.

Geoprobe Soil Samples

Three shallow Geoprobe soil borings were drilled in the concrete-covered parking area along the southeast side of the Central Storage building for this investigation. The Geoprobe soil borings were advanced to ten feet and did not encounter ground water or bedrock. Figure 2 shows the location of these sampling sites.

GP-1 encountered concrete rubble and sand fill beneath the concrete to a depth of 1.9 feet. Beneath this fill was approximately 1 foot of black fill consisting of loose coarse sand, brick and asphalt fragments, and possibly coal dust. The black material had no odor and no VOCs were detected in the headspace sample from that interval. The material did not resemble the smelter waste found at the Denver Coliseum parking lot (WALSH, 1997). The black fill material rested on 2 feet of fine sandy, clayey silt (natural sediment), which overlaid very clayey sand. This clayey sand graded downwards into coarse to very coarse loose sand. No odors, staining, headspace VOCs or abnormal radiation was detected. The black fill material was only found in the southernmost of the three Geoprobe soil sample sites and was not found in the three test holes that have been drilled on Parcel 49.

GP-2 was drilled opposite the middle of the Central Storage building. Concrete rubble and sand fill to 2 feet was noted beneath the concrete surface. No black fill material was present in

this soil boring. The hole penetrated 0.8 feet of fine sandy clayey silt which overlaid clayey very fine sand (3.2 feet) and loose very fine to very coarse sand to total depth. No staining, odors, headspace VOCs, or abnormal radiation was detected in this soil boring.

GP-3 was drilled near the northern end of the parking area. Approximately 4 feet of fill was noted beneath the concrete surface. This fill consisted of large granite cobbles, fragments of concrete and brick, and grayish brown clayey sand. No staining or odor was noted in the fill. The fill rested on natural sediment which consisted of 2 feet of fine sandy, clayey silt which abruptly overlaid 0.5 feet of very coarse sand and fine gravel which graded into loose, fine gravel and very coarse sand to total depth. No staining, odors, headspace VOCs, or abnormal radiation was detected in this soil boring.

9.1.2 Parcel 50 (Western Boom)

Two test holes were drilled on Parcel 50 (4415 Brighton Boulevard, Western Boom). TH-21 was drilled along 44th Street down-gradient of the presumed location of two USTs which were shown on the 1945 and 1958 Sanborn Insurance maps. No record of the removal of these USTs exists. TH-22 was drilled near the west corner of the Western Boom building to investigate possible soil and ground water contamination from the 8 ASTs which were present at the site from 1936 to about 1974. The site was also chosen to determine if soil and ground water contamination resulted from the floor drains in the building which were not permitted to discharge to a public sewer system and were not connected to a sand trap (WALSH, 1996). TH-22 is also located near the proposed site of the UPRR track relocation.

No stained soils, headspace VOCs, explosives gases or abnormal radiation was detected in any field-screened soil sample from either TH-21 or TH-22. This lack of visible contamination was surprising considering the parcel's history of past usage.

TH-21 encountered approximately 12.5 feet of fine to medium loose sand beneath the asphalt surface. This sand coarsened downwards and sharply overlaid 4 feet of moist, plastic sandy silt. The silt graded into coarse sand and gravel from 17 feet to total depth. The test hole was sampled to 36.5 feet and completed to 35 feet. Ground water was encountered at about 30.4 feet below the surface. No staining, odors, headspace VOCs, explosive gases or abnormal radiation was detected in the samples.

TH-22 encountered nearly the same geologic section as seen in TH-21, except that 6 feet of fill was noted beneath the concrete surface. This fill consisted of sand and brick fragments and appeared to be uncontaminated. Ground water was encountered at about 30.5 feet below the surface. The test hole was completed to 35 feet. No staining, odors, explosive gases, headspace VOCs, or abnormal radiation was detected.

9.1.3 Parcels 52 and 53 (unpaved parking lot and vacant storage lot)

TH-18 (WALSH 1991) was drilled approximately 92 feet north-northwest of TH-22, along the property boundary of Parcels 52 and 53. This test hole was resampled for TVPH and TEPH on May 8, 1998. Ground water was measured at 29.10 feet below TOC (approximately 29.4 feet below the surface). The stratigraphic section in this test hole is similar to TH-21 and TH-22, consisting of sands and silts to 12.5 feet, a thin clay layer followed by coarser sand and gravels to total depth (40 feet). Bedrock was not penetrated. No staining, odors, headspace VOCs, explosive gases or abnormal radiation was detected (WALSH, 1992).

9.1.4 Parcel 42 (O G Valentine Lumber)

One test hole was drilled near the southeast corner of this parcel (1610 East 46th Avenue) along the projected route of a storm sewer. The test hole was also positioned to determine if the soil and ground water contamination noted in TH-10 (see below) may have originated at an up-gradient location to Parcel 42.

TH-23 encountered a similar geologic section to that noted in TH-18, TH-21, and TH-22 (Parcel 50). Loose medium to fine sand to 8 feet was noted above 4 feet of sandy silt. The silt overlaid coarse sand and gravel to total depth (35 feet). Bedrock was not penetrated and ground water was measured at approximately 29.5 feet below the surface. No staining, odors, headspace VOCs, explosive gases or abnormal radiation was detected.

Aguirre drilled a test hole near the location of TH-23 in 1995 (Aguirre, 1995). This test hole (TH-22) was not sampled for environmental parameters. Ground water was measured at about 28.6 feet below the surface and bedrock was penetrated at 13.9 m (45.5 feet) below the surface. No contamination was documented in the Aguirre log description.

WALSH drilled TH-10 near the northwest corner of Parcel 42 in 1991. This well was drilled to document possible soil and ground water contamination from two out-of-service USTs owned by O G Valentine Lumber. This well was resampled for TEPH and TVPH in May 1998. TH-10 encountered sands and gravels from the surface to total depth (40 feet). Petroleum odors were noted at 24 feet to total depth and black staining was detected at 30 feet, decreasing with depth and disappearing by 40 feet. Headspace PID readings ranged from 0 to 220 ppm near the ground water contact (28.5 feet below the surface). Ground water recovered in the May 1998 sampling event was dark gray with a spotty sheen, and had a mild petroleum odor.

Aguirre also drilled a soil boring in the northeast corner of Parcel 42. This soil boring, (B-14), was drilled to bedrock (45.9 feet below the surface) and encountered the same section as noted in TH-10 and TH-22 (Aguirre, 1995). No contamination was noted in the description.

9.1.5 Parcel 79 (Denver Fire Station #9)

WALSH drilled TH-7 near the southwest corner of this parcel slightly up-gradient to an UST containing diesel fuel (WALSH, 1991). Ground water was encountered at approximately 28.5 feet and appeared dark gray. Faint hydrocarbon odors were detected in the samples from 12.5 to 25 feet and again at approximately 35 feet. Possible staining was noted in the samples from 37 feet.

Testing revealed that the tank piping had leaked and holes were noted in the tank when it was removed. Approximately 40 yards of diesel-contaminated soil was removed from the excavation, although utilities and the building foundation prevented the complete removal of the contaminated soil. A vapor extraction and ground water treatment system was installed I late 1993. Benzene levels in the ground water were reduced to just above the MCL when low ground water pH prevented further discharge without expensive treatment modifications. The operator of the remediation system claimed that a plume of gasoline contamination having a low pH and dark gray color was intersected by the recovery wells. HWS contends that this plume originated on Parcel 42 (O G Valentine) (HWS Consulting Group, 1995).

9.1.6 Parcel 43 (Darko's Automotive)

Permission to access this property (1633 East 46th Avenue) was not granted. The property is currently the site of Darko's Automotive, an automobile repair facility. The surface of the lot is obscured with car bodies and parts. TH-14, which was drilled by WALSH in 1991, could not be accessed to determine if it could be resampled. Oil contamination, substantial amounts of PAHs, and elevated concentrations of cadmium, lead, zinc, and mercury were noted in the shallow soils (surface to four feet).

TH-14 encountered black stained soils from near the surface to approximately 4 feet. This fill rested on 1 foot of naturally-occurring clay which rested on sands ad gravels to total depth (41.5 feet). Bedrock was not penetrated and ground water was measured at approximately 28.5 feet below the surface. Headspace PID readings ranged from 0 to 9 ppm. The headspace PID reading in the black fill was 2 ppm.

9.1.7 Parcel 99 (Lambert storage building)

One test hole was drilled on Parcel 99 (4614 Baldwin Court, Lambert storage building) near the northwest corner of the concrete block structure. This location was chosen to document the possible presence of soil and ground water contamination from floor drains in the former automobile service and painting bay which may be connected to a sand trap.

TH-24 encountered 7 feet of fill beneath the asphalt surface. This fill consisted of brick fragments, sand and coal dust. It appeared to be have a black stain, although no odors or headspace VOCs were noted in the samples. The questionable staining extended into the

underlying natural sediment (coarse sand) to a depth of 10.2 feet. Thin sandy clay layers at 10.2 and 15.0 feet separated the coarse sand and gravels which comprised the remainder of the section. The well was sampled to 36.5 feet and completed to 35 feet. Ground water was measured at approximately 29.8 feet below the surface and bedrock was not penetrated. No odors, headspace VOCs, explosive gases or abnormal radiation was detected.

TH-12 (WALSH 1991) was drilled on Parcel 99 approximately 40 feet west-southwest of TH-24. This well has been abandoned. Fill material was noted beneath the beneath the asphalt surface, but no staining was reported. The section penetrated is similar to that noted above in TH-24. PID readings ranging from 15 to 30 ppm were recorded from the soil samples at staring at 5 feet and continuing to total depth (41.5 feet). Ground water was measured at approximately 27.5 feet below the surface.

Two Aguirre geotechnical test holes (TH-23 and B-15) were drilled along the east side of Baldwin Court to the north and south of Parcel 99.

TH-23 (78 feet west-northwest of TH-24) was drilled in 1994 to a total depth of 16.5 m (54 feet). Bedrock (weathered claystone) was penetrated at 13.6 m (44.5 feet). The section resembled that described in WALSH TH-24 and consisted of clayey sands to approximately 12 feet followed by sands and gravels to bedrock. Ground water was measured at 10.1 m (33.0 feet) below the surface (Aguirre, 1995). This water level seems low in comparison to that measured in TH-24 and may represent a water level that had not reached equilibrium.

B-15 (30 m or 98 feet southwest of TH-24) was drilled to bedrock in 1992. This borehole encountered clean sand to approximately 16 feet, clayey sand to 19 feet, and sand and gravel to top of bedrock (weathered claystone) at 14 m (45.8 feet). Ground water was recorded at approximately 27.6 feet below the surface. No contamination was noted in the log description (Aguirre, 1995).

9.1.8 Parcel 54 (Lambert Auto Parts)

No additional sampling was conducted on his parcel (4605 Brighton Boulevard, Lambert Auto Parts paved parking lot). TH-13 (WALSH 1991) was drilled down-gradient of a former UST near the north central portion of the parcel. The test hole has been plugged and abandoned. TH-13 is approximately 78 feet southwest of TH-25 (see below). The geologic section encountered in TH-13 consisted of fill (approximately 1 foot, brick fragments), clay (3.5 feet) and sand and gravel to total depth (41 feet). Bedrock was not penetrated. Ground water was measured at approximately 28.5 feet below the surface. The ground water was discolored (black) and had a mild to strong hydrocarbon odor. Staining was noticed in the soil sample at 30 feet; staining decreased with depth and was no longer noticeable at 40 feet. Headspace PID readings ranged from 14 to 120 ppm and were above background levels in all samples.

9.1.9 Parcel 55 (Lambert Automobile Electronics)

One test hole (TH-25) was drilled near the southeast corner of the Lambert's Auto Electronics building at 4615 Brighton Boulevard. This location is along the path of a proposed sewer line and is down-gradient to an UST which was shown on the 1945 Sanborn Insurance map. This UST may now be located in Brighton Boulevard. The fate of the UST is unknown, but it may be located in the present Brighton Boulevard.

TH-25 encountered 5 feet of fill beneath the asphalt-covered parking lot. This fill consisted of sand, gravel, and brick fragments and had no odor or staining. The fill rested on a very thin (0.1 foot thick) layer of clayey sand over gravel. A minor PID reading of 2 ppm was registered from this interval (5-6.5 feet) and some black particles, thought to be asphalt slough from the overlying fill were also noted. The coarse gravel and clayey sand in the following sample (10-11.5 feet) also exhibited a very slight headspace PID reading of 1 ppm. Coarse gravels were logged from 11.5 feet to total depth (36.5 feet). No staining, explosive gases, odors or abnormal radiation was detected. Bedrock was not penetrated and the ground water was measured at approximately 29.3 feet below the surface.

There are no Aguirre test holes in the vicinity of TH-25.

TH-11 (WALSH 1991) was drilled near the northwest corner of Parcel 55, down-gradient from a former waste oil UST. This test hole encountered a thin layer of fill (0.8 feet) over clayey sand (3 feet) followed by 37.5 feet of sand and gravel. The sands below the water table (approximately 27.5 feet below the surface) were slightly discolored (light gray). The ground water did not appear to be discolored. Headspace VOCs were above background in all samples and ranged from 15 to 31 ppm. Bedrock was not penetrated (WALSH, 1991). TH-11 is plugged and could not be resampled in May 1998.

9.1.10 Parcel 46 (Hydraulic Equipment Repair and I-70 Entrance Ramp Area)

WALSH drilled two test holes on this parcel in 1991: TH-06 was drilled slightly down-gradient of three USTs (fate unknown); TH-15 was drilled near the location of 14 ASTs which once held bulk petroleum products (WALSH, 1991b).

TH-06 encountered fill to 2 feet which rested on 2 feet of natural clay. Sands and gravels were penetrated below the clay to total depth (41 feet). No odors, staining, headspace PID readings or abnormal radiation was detected in TH-06. Ground water was encountered at approximately 28 feet below the surface and bedrock was not penetrated.

TH-15 encountered black fill material from the surface to approximately 2.5 feet. PID headspace measured 15 ppm from this interval. This fill material rested on approximately 2.5 feet of naturally-occurring clay. Sands and gravels were encountered beneath the clay to 41.5 (top of bedrock, weathered claystone). Headspace PID readings ranged from 8 to 13 ppm

from 2.5 feet to total depth (41.5 feet). Ground water was measured at approximately 28 feet below the surface. No odors or staining was noted in the samples from this test hole.

Two Aguirre geotechnical holes (B-17 and B-18) were drilled on this parcel. B-17 (1992) was drilled approximately 30 feet northwest of TH-15. Total depth was 54 feet. Ground water was measured at 27.6 feet below the surface and weathered claystone bedrock was penetrated at 46.6 feet. No mention of contamination was found in the log description (Aguirre, 1995).

B-18 (1992) was drilled in the on ramp area, approximately 65 feet northeast of TH-06. B-18 was drilled to 54 feet, encountered ground water at 28.0 feet and bedrock at 43.3 feet. No contamination was mentioned in the log description (Aguirre, 1995).

9.1.11 Proposed Pedestrian Underpass East 46th Avenue

One Geoprobe soil boring (GP-4) was drilled in the median strip between the east- and west-bound lanes of East 46th Avenue along the path of a proposed pedestrian underpass connecting the Denver Coliseum and National Western Stock Show buildings (see Figure 2). This soil boring was advanced to ten feet.

GP-4 encountered approximately 4.5 feet of fill beneath the asphalt-covered surface. This fill consisted of coarse gravel, asphalt fragments, and occasional brick fragments. The fill was dark gray in color and appeared to also contain fine coal fragments and coal dust. Moist loose sand and gravel was logged beneath the fill. No headspace VOCs, staining, odors, explosive gases or abnormal radiation were associated with any sample from this boring.

9.2 Hydrology

Surface drainage in the Phase II and III construction areas is channeled via storm sewers to the South Platte River. Surface runoff along Brighton Boulevard is similarly collected by the storm sewers with outfalls along the east bank of the South Platte River, near East 45th Avenue.

Ground water flow direction in the Phase II and III construction areas is towards the northwest, that is, towards the South Platte River. Figure 3 shows the potentiometric surface between 44th Street and Brighton Boulevard utilizing the ground water elevation data from the WALSH 1998 monitoring wells. The data was collected on May 26, 1998. Ground water gradient in this area was computed to be 0.0057 ft/ft. Figure 4 is a depth to ground water map (measurements in feet). Table 3 summarizes the current and historical ground water levels in the various environmental and geotechnical test holes.

Table 3 Depth to Groundwater (Feet)				
Location	Depth to Ground Water Below T.O.C.	Elevation of Casing	Elevation of Surface	Ground Water Elevation
WALSH Test Holes May 1998 [A]				
TH-19	29.65	5187.27		5157.62
TH-20	29.81	5187.41		5157.60
TH-21	30.16	5187.63		5157.47
TH-22	30.18	5187.50		5157.32
TH-23	29.23	5185.71		5156.48
TH-24	29.42	5185.11		5155.69
TH-25	28.96	5184.98		5156.02
WALSH Test Holes June 1997[G]				
DC-2	15.14	5168.25	5168.45	5153.11
DC-3	10.02	5163.72	5163.99	5153.70
DC-4	9.09	5162.00	5162.32	5152.91
WALSH Test Holes 1991[B]				
TH-1	17.37	5170.08	5170.29	5152.71
TH-2	12.62	5163.41	5163.74	5150.79
TH-3	9.87 10.10[C]	5160.09	5160.26	5150.22 5149.99
TH-4	11.48	5158.47	5158.72	5146.99
TH-5	18.08	5152.01	5150.28	5133.93
TH-6	28.80	5184.31	5183.12	5155.51
TH-7	26.88[F]	5180.78	5181.17	5153.90
TH-8	28.82	5181.78	5182.03	5152.96
TH-9	29.03	5182.96	5183.13	5153.93
TH-10	27.09 28.23[H]	5181.24	5181.48	5154.15 5153.01
TH-11	27.87	5181.56	5181.85	5153.69
TH-12	27.68	5181.62	5181.93	5153.94
TH-13	27.46	5181.83	5182.18	5154.37
TH-14	27.03[F]	5181.00	5181.37	5153.97
TH-15	26.66	5182.54	5182.95	5155.88
TH-16	28.62 29.95[H]	5184.50	5184.71	5155.88 5154.55
TH-18	28.05 29.10[J]	5183.24	5183.65	5155.19 5154.14
Aguirre Piezometers 1992-1994[D]				
BW-1	(6.1) 20.0		(1568.5) 5144.7	5124.7
BW-5	(9.8) 32.1		(1572.0) 5156.2	5124.1
BW-10	(7.6) 24.9		(1574.6) 5164.7	5139.8
BW-13	(11.9) 39.0		(1579.4) 5180.4	5141.4
BW-18	(10.7) 35.1		(1580.0) 5182.4	5147.3
THW-29	(13.1) 43.0		(1579.2) 5179.8	5136.8

Table 3 (Cont'd) Depth to Groundwater (Feet)				
Location	Depth to Ground Water	Elevation of Casing	Elevation of Surface	Ground Water Elevation
Aguirre Soil Borings[E] 1992				
B-2	(7.6) 24.9		(1569.6) 5148.3	5123.4
B-3	(2.2) 7.2		(1566.3) 5137.5	5130.3
B-4	(7.3) 23.9		(1571.9) 5155.8	5131.9
B-6	---		(1570.6) 5151.6	---
B-7	(13.4) 44.0		(1572.6) 5158.1	5114.1
B-8	(12.9) 42.3		(1572.6) 5158.1	5115.8
B-9	(8.8) 28.9		(1573.7) 5161.7	5132.8
B-11	(9.1) 29.8		(1579.4) 5180.4	5150.6
B-12	(8.8) 28.9		(1579.6) 5181.1	5152.2
B-14	(8.6) 28.2		(1579.4) 5180.4	5152.2
B-15	(8.4) 27.6		(1579.4) 5180.4	5152.8
B-16	(8.4) 27.6		(1579.1) 5179.4	5151.8
B-17	(8.4) 27.6		(1579.7) 5181.4	5153.8
B-19	(8.3) 27.2		(1579.9) 5182.1	5154.9
Aguirre Test Holes[E] 1994				
TH-1	(6.0) 19.6		(1569.7) 5148.6	5129.0
TH-2	(4.0) 13.1		(1569.4) 5147.6	5134.5
TH-3	(1.3) 4.1		(1566.0) 5136.5	5132.4
TH-4	(7.0) 23.0		(1571.7) 5155.2	5132.2
TH-5	(6.4) 20.9		(1571.8) 5155.5	5134.6
TH-6	---		(1571.1) 5153.2	---
TH-7	(5.5) 18.0		(1573.3) 5160.4	5142.4
TH-8	(3.6) 11.8		(1572.7) 5158.5	5146.7
TH-9	(5.2) 16.9		(1572.5) 5157.8	5140.9
TH-10	(3.9) 12.8		(1572.5) 5157.8	5145.0
TH-11	(3.6) 11.9		(1572.6) 5158.1	5146.2
TH-12	(3.9) 12.8		(1572.5) 5157.8	5145.0
TH-13	(3.3) 10.8		(1573.2) 5160.1	5149.3
TH-14	(3.9) 12.8		(1574.2) 5163.4	5150.6
TH-15	(5.2) 16.9		(1574.8) 5165.3	5148.4
TH-16	(6.7) 21.9		(1576.1) 5169.6	5147.7
TH-17	(8.2) 27.0		(1578.2) 5176.5	5149.5
TH-18	(9.4) 30.8		(1579.6) 5181.1	5150.3
TH-19	(10.8) 35.4		(1579.5) 5180.8	5145.4
TH-20	(12.5) 41.0		(1579.3) 5180.1	5139.1
TH-21	(9.3) 30.5		(1579.9) 5182.1	5151.6
TH-22	(8.8) 28.9		(1579.8) 5181.7	5152.8
TH-23	(9.6) 31.5		(1579.3) 5180.1	5148.6
TH-24	(8.4) 27.6		(1579.5) 5180.8	5153.2
TH-25	(8.4) 27.6		(1579.6) 5181.1	5153.5

Table 3 (Cont'd) Depth to Groundwater (Feet)				
Location	Depth to Ground Water	Elevation of Casing	Elevation of Surface	Ground Water Elevation
TH-26	(8.8) 28.9		(1579.8) 5181.7	5152.8
TH-27	(8.5) 27.9		(1579.8) 5181.7	5153.8
TH-28	(7.9) 25.9		(1579.3) 5180.1	5154.2
TH-30	(7.9) 25.9		(1579.4) 5180.4	5154.5

[A] = Test holes drilled May 1998. Water levels measured on May 26, 1998. Measurements in feet.
[B] = Water levels measured February 13, 1992. Measurements in feet.
[C] = Water level measured on June 5, 1997. Measurement in feet.
[D] = Water measurements latest available - January 31, 1995. Measurements in parentheses meters.
[E] = Water levels probably not stabilized at time of measurement.
[F] = Water level measurements from April 9, 1991.
[G] = Water level measurements from June 5, 1997.
[H] = Water level measurement from May 26, 1998.
[J] = Water level measurement from May 5, 1998.
T.O.C. = Top of Casing

Color Map(s)

The following maps contain color that does not appear in the scanned images. To view the actual images please contact the Superfund Record Center at (303) 312-6473.

National Western
Stock Show

Humboldt Street

Proposed Pedestrian
Underpass

Denver
Coliseum

44th Street

Brighton Boulevard

TH-1(W)
TH-2(W)
5155.69
TH-3
5156.02
TH-4(W)
TH-5(W)
TH-6(W)
TH-7(W)
TH-8(W)
TH-9(W)
TH-10(W)
TH-11(W)
TH-12(W)
TH-13(W)
TH-14(W)
TH-15(W)
TH-16(W)
TH-17(A)
TH-18(W)
5157.00
TH-19
5157.62
TH-20
5157.60
TH-21
5157.50
TH-22
5157.82
TH-23
5156.18
TH-24(A)
TH-25(A)
TH-26(A)
TH-27(A)
TH-28(A)
TH-29(A)
TH-30(A)
B-10(A)
B-11(A)
B-12(A)
B-13(A)
B-14(A)
B-15(A)
B-16(A)
B-17(A)
B-18(A)
B-19(A)
BW-10(A)
BW-13(A)
DC-1(W)
DC-2(W)
GP-1
GP-2
GP-3
5156.00
5156.50
105

50 m
152.5 ft
APPROXIMATE SCALE

Explanation

- Washington Street Shallow Soil Boring (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997) Completed as Monitor Wells
- Walsh Monitor Well (1991)
- Aguirre Geotechnical Hole (1994,1995)
- Walsh Geoprobe Soil Sample Site, 1998
- Walsh Test Hole, 1998
- 33 Approximate Property Boundary and ID Number
- Former Aboveground Storage Tank(s)
- Excavated Area (1948 Air Photo)
- Former Barrel Storage
- Former Underground Storage Tank(s)
- Underground Storage Tank(s) - Removal Unknown
- Underground Storage Tank(s)
- Approximate Location of Former Gas Station Tank Type (UST or AST) Unknown, UST Removal Unknown
- Proposed sidewalks and riprap
- Proposed curbs and gutters
- Proposed retaining walls
- Proposed storm and/or sanitary sewers
- Proposed gas
- Proposed telephone
- Proposed water line

Walsh
Environmental Scientists and Engineers, Inc.

POTENTIOMETRIC SURFACE MAP

Humbolt/44th Street to Brighton Boulevard

Job 3008-020 | Date 6/98 | Figure 3

3008m01b.dwg 8/25/98 PB

National Western
Stock Show

Humboldt Street

Proposed Pedestrian
Underpass

Denver
Coliseum

44th Street

Brighton Boulevard

TH-1(W)
TH-2(W)
TH-3(W)
TH-4(W)
TH-5(W)
TH-6(W)
TH-7(W)
28.0
TH-8(W)
TH-9(W)
29.2
TH-10(W)
28.5
TH-11(W)
TH-12(W)
28.0
TH-13(W)
27.8
TH-14(W)
27.1
TH-15(W)
27.4
TH-16(W)
29.5
TH-17(A)
TH-18(W)
29.5
TH-19
30.1
TH-20
30.1
TH-21(A)
30.5
TH-22(A)
28.9
TH-22
30.5
TH-23(A)
31.5
TH-24
29.1
TH-25(A)
27.9
TH-26(A)
28.9
TH-27(A)
27.9
TH-28(A)
TH-29(A)
TH-30(A)
B-10(A)
27.2
B-11(A)
B-12(A)
35.1
B-13(A)
B-14(A)
28.2
B-15(A)
27.4
B-16(A)
27.6
B-17(A)
27.6
B-18(A)
BW-10(A)
BW-13(W)
DC-1(W)
DC-2(W)
GP-1
GP-2
GP-3

0 50 m
0 152.5 ft
APPROXIMATE SCALE

Explanation

- Washington Street Shallow Soil Boring (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997) Completed as Monitor Wells
- Walsh Monitor Well (1991)
- Aguirre Geotechnical Hole (1994,1995)
- Walsh Geoprobe Soil Sample Site, 1998
- Walsh Test Hole, 1998
- 33 Approximate Property Boundary and ID Number
- Former Aboveground Storage Tank(s)
- Excavated Area (1948 Air Photo)
- Former Barrel Storage
- Former Underground Storage Tank(s)
- Underground Storage Tank(s) - Removal Unknown
- Underground Storage Tank(s)
- Approximate Location of Former Gas Station Tank Type (UST or AST) Unknown, UST Removal Unknown
- Contour interval = Variable
- Proposed sidewalks and riprap
- Proposed curbs and gutters
- Proposed retaining walls
- Proposed storm and/or sanitary sewers
- Proposed gas
- Proposed telephone
- Proposed water line

Walsh
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DEPTH TO GROUND WATER (feet)
PHASE II AND PHASE III CONSTRUCTION

Job 3008-020	Date 6/98	Figure 4

3008m01b.dwg 6/25/98 PB

9.3 Analytical Results

9.3.1 Soil Samples

The concentration of metals in composited soil samples from the seven test holes drilled in the Phase II and III construction areas is within the typical local and regional ranges (Table 4). Geoprobe soil sample results are summarized in Table 5. Complete analytical results are presented in Appendix 5.4.

The results of SVOC (EPA Method 8270) analyses from soil samples is summarized in Table 6. Full analytical results are presented in Appendix 5.2.

Soil samples were collected for Total Extractable Petroleum Hydrocarbons (TEPH) analyses from two zones in each of the seven test holes drilled for this site investigation. One sample was collected from each test hole from the locally persistent silty fine sand (or near the base of fill at approximately 5 to 6.5 feet below the surface). A second sample was collected near the ground water contact at approximately 30 to 31.5 feet below the surface. Table 7 summarizes the findings; complete analytical results are presented in Appendix 5.1.

Table 7 summarizes the results of the Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX), Methyl Tert-butyl Ether (MTBE) and Total Volatile Petroleum Hydrocarbons (TVPH) soil analyses. The full analytical results are found in Appendix 5.1.

9.3.2 Ground Water Samples

Table 9 summarizes the results of the EPA Method 8260 analyses for VOCs in ground water. The complete analytical findings are presented in Appendix 5.5. Figure 5 illustrates the relative locations and concentration of the various volatile organic compounds in the ground water. Table 10 summarizes the concentrations of chlorinated solvents detected in EPA Method 8260 analyses from ground water samples collected in 1991.

No diesel-range hydrocarbons (TEPH by EPA Method Modified 8015/Modified 8100) were detected in the ground water samples collected from the WALSH 1998 test holes (TH-19 through TH-25). Full analytical results are presented in Appendix 5.6.

Gasoline-range hydrocarbon (TVPH by EPA Method Modified 8015/Modified 8100) analyses of ground water samples are summarized in Tables 11 and 12. Table 12 also summarizes the data from the 1991 study (WALSH, 1991b, 1992).

Table 13 summarizes the total dissolved metals in ground water. The complete analyses and a summary of the 1991 results are presented in Appendix 5.7.

Analytical results pertaining to the individual properties are discussed below. A listing of analyses performed for this investigation is contained in Appendix 1.0.

Parcel 49 (Central Storage)

Elevated concentrations of arsenic (93 mg/Kg), lead (970 mg/Kg) and silver (4.3 mg/Kg) were measured in the black fill material in GP-1 (see Table 5). This Geoprobe soil sample was collected from the concrete-covered parking area along the southeast side of the Central Storage building. The elevated concentration of silver in the fill material suggests that, although the material resembled coal dust and not the typical smelter waste as found earlier in the parking area of the Denver Coliseum (Phase I area, WALSH, 1997), at least a portion of this fill is comprised of smelter waste from the former Omaha and Grant Smelter. Concentrations of metals in the other Geoprobe samples from the site (GP-2 and GP-3) were within regional and local ranges. A second composite sample from GP-1, but excluding the black fill material, was within regional and local ranges for total metals (Table 5).

The lead content in the fill from GP-1 is above the Consent Decree level (500 ppm) for the Globeville Smelter (Margaret Staub, ASARCO Globeville Facility Manager 07-10-97). A typical action level for lead in soil in industrial settings is 500 mg/Kg (ppm). A toxicity characteristic leaching procedure (TCLP) was performed on the elevated lead and arsenic content of GP-1. The results were below detection limits (<0.050 mg/Kg) for arsenic and 0.24 mg/Kg for lead (Table 5). Based on these results, the black fill material in GP-1 would be classified as a special, and not a hazardous waste, under the Resource Conservation and Recovery Act (RCRA).

Elevated concentrations of lead (210 mg/Kg) were also detected in the 2.5 foot grab sample from TH-16, drilled near the north end of the Central Storage building in 1991 (WALSH. 1992). This sample was collected from a black-colored fill material (also found on Parcel 46). Concentrations of total RCRA-8 metals in TH-19 and TH-20 were within regional and local ranges (Table 4).

Low concentrations of SVOCs were detected in the composite soil samples from TH-19 and TH-20 (Table 6). The SVOCs detected at Central Storage include 2,6-dinitrotoluene (500 ug/Kg) from TH-19 and elemental sulfur (1,900 ug/Kg) in TH-20. These compounds may be attributed to incomplete coal combustion products or possibly to fertilizer materials once stored in the structure. These compounds do not pose a significant health or safety risk at these concentrations.

Black-colored soil, believed to be petroleum contaminated, was noted in TH-19 at the 6 to 6.3-foot interval. The analytical results from this interval were non-detect for petroleum contamination (Table 7). Low concentrations of toluene (12 ug/Kg) and xylenes (5.6 ug/Kg) were detected in the soil samples near the ground water contact in TH-19 (Table 7).

Staining and a slight hydrocarbon odor was noted in the 35 to 36-foot level in TH-20. MTBE (9 ug/Kg) was the only petroleum–associated contaminant detected from the soil at this level (30-31.5 foot interval). The source of the MTBE at Central Storage is unknown and may originate up-gradient of this parcel.

No volatile petroleum hydrocarbons were detected in the ground water from TH-19 or TH-20 (Table 11). TVPH at 770 ug/L was also detected in the resampled TH-16 test hole, drilled near the north end of Parcel 49 in 1991. This result represents a significant increase over the 1991 level (5 ug/L MTBE and 2 ug/L PCE, WALSH, 1992).

PCE (140 ug/L and an unknown conjugated compound (8.6 ug/L) were detected in the ground water by EPA Method 8260 from TH-19. PCE was also detected in TH-20 (8.1 ug/L) (Table 9). Both of these concentrations exceed the MCLs for this compound (5 ug/L). PCE was detected in 1991 from TH-16 at 2 ug/L (Table 10). The source of this contamination is unknown, but the significant increase in the TVPH in TH-16 suggests that a plume of contamination may have migrated onto the property from an off-site up-gradient source.

Parcel 50 (Western Boom)

The metal content of the soil samples was within regional and local norms (Table 4) and no SVOCs were detected in any soil sample (Table 6).

Diesel-range hydrocarbons (TEPH) at 3,100 ug/Kg were detected in TH-21 in the shallow sample interval (5-6.5 feet, Table 7) but were not detected in the sample from the 30-31.5 foot interval. Total xylenes (340 ug/Kg) and MTBE (1,200 ug/Kg) were detected from this interval. No hydrocarbon contamination was detected in the shallow soil sample from TH-22 (10-11.5 feet). Minor contamination was detected in the deeper sample from 30-31.5 feet (total xylenes at 5.1 ug/Kg and 8.7 ug/Kg MTBE).

The source of the TEPH and gasoline-range fuel contamination is unknown but may originate at the site due to leaking ASTs or USTs at the bulk petroleum storage which once existed on the property. An off-site source is also possible.

The source of the MTBE is also unknown and may originate from an up-gradient location southeast of the parcel. The bulk storage ASTs and USTs which once existed on the property were removed prior to the widespread introduction of MTBE to the Front Range area. The low level of petroleum contamination in the soil samples from TH-21 (with the exception of MTBE) suggests that the UST indicated to exist near the south apex of the property has been removed (Sanborn Insurance maps for 1945 and 1958, WALSH, 1991b).

Methylene chloride (DCM) was detected in TH-21 (12 ug/L) and TH-22 (17 ug/L) (Table 9). These levels exceed the MCLs for drinking water for these compounds (5 ug/L). Methylene chloride is a common laboratory contaminant. However, DCM was not detected in other water samples collected during this sampling event. The source of the methylene chloride is

unknown, but could originate either at the site (former location of 14 ASTs and 4 USTs) or from an unknown up-gradient location. The high concentration of PCE on Parcel 49 implies that the source for the PCE on Parcel 50 is up-gradient, that is, to the southeast.

Parcel 53 (Vacant storage lot)

SVOCs (8,200 ug/Kg) were detected in TH-18, which was drilled in 1991 on the property boundary between Parcels 53 and 52 (unpaved parking lot). The SVOCs consisted of unknown oxygenates, paraffins, and bio-organic compounds and are not considered to be significant health or environmental risks. The source of the SVOCs is unknown but could be attributable to incomplete combustion products from fuels, spillage or infiltration of materials stored at the site, or a component of the fill material used to bring the parcel to grade.

No volatile or extractable petroleum hydrocarbons were detected in TH-18 in the 1998 ground water samples (Table 12, Appendix 5.6), although the 1991 results indicated a TVPH level of 890 ug/L (WALSH, 1991b). The difference in these values suggests migration or attenuation of a petroleum plume across the site.

PCE (5 ug/L) and MTBE (890 ug/L) were also detected in the ground water in 1991 (WALSH, 1991b). The MCL for PCE is 5 ug/L; there is no established MCL for MTBE. The source of these compounds is unknown.

Parcel 42 (O G Valentine Lumber)

TH-23 was drilled along the proposed route of a sewer line and up-gradient to a suspected leaking UST under the northwest corner of the O G Valentine building. Total RCRA-8 metals in soils were with regional and local ranges in TH-23 (Table 4).

No SVOCs were detected in the soil from TH-23 (Table 6).

No diesel-range or BTEX compounds were detected in soil samples from TH-23 (Table 7). MTBE was detected in the shallow and deep samples from TH-23 (9.3 ug/Kg at 5-6.5 feet and 8.6 ug/Kg at 30-31.5 feet) (Table 7).

Total dissolved metals in the ground water sample were within MCLs.

PCE (31 ug/L) was detected in the ground water from TH-23 (Table 9). This concentration is above the MCL for this compound. The source of the PCE is unknown. If the source originated up-gradient to the parcel, it may be related to the source of the PCE noted on Parcels 49, 50, and 52/53 and 40.

No volatile petroleum hydrocarbons were noted in the ground water from TH-23.

TH-10 was drilled in 1991 in a down-gradient position to a disused dispenser and UST which was located near the north side and adjacent to the foundation of the O G Valentine Lumber building. Diesel-range hydrocarbons (1,100 ug/L) were detected in resampled TH-10 (Appendix 5.6). Ground water from TH-10 was discolored (gray) and had a mild petroleum odor and spotty sheen. An unused gasoline dispenser and UST at this site and up-gradient of this test hole is the most likely source of these diesel-range hydrocarbons. This hypothesis is strengthened since no TVPH contamination was noted in TH-23 (up-gradient to TH-10). The lack of TVPH contamination in TH-23 suggests that no off-site petroleum contamination has impacted the property.

Total volatile petroleum hydrocarbons totaling 770 ug/L were detected in the ground water sample from TH-10 in 1998 (Table 12). These results are significantly lower than that recorded in 1991 (58,360 ug/L)(WALSH, 1991b) and in 1992 (7,000 ug/L, Denver Fire Station 9, quarterly monitoring report, ET Technologies, 1993). The UST near the north end of the O G Valentine building is the likely source of these hydrocarbons.

Quarterly monitoring reports from the Denver Fire Station #9 (HWS Consulting, 1995) suggest that two plumes exist on Parcel 79; one (mainly diesel) originating from a former leaking UST on the fire station property and another (mostly gasoline) from an up-gradient location, presumably Parcel 42. These plumes (orientation from HWS Consulting Group, 1995) are depicted on Figure 6.

Parcel 79 (Denver Fire Station #9)

TH-7 was drilled by WALSH near the southwest corner of the parcel in 1991. The location was slightly up-gradient to a diesel UST on the property.

No VOCs or SVOCs were detected in the soil samples from this test hole and total metals were within regional ranges.

Total dissolved metals in the ground water sample from TH-07 were within MCLs.

Benzene (150 ug/L), toluene, ethylbenzene and xylenes were detected in the ground water sample. The concentration of benzene exceeded the Colorado MCL. No chlorinated compounds were detected in 1991.

SVOCs in ground water totaled 530 ug/L and consisted mainly of petroleum degradation products.

The source of this contamination was assumed to be the diesel fuel UST on the fire station property. Later investigations indicated that contamination from a leaking UST on the O G Valentine property (Parcel 42) is also present.

Parcel 43 (Darko's Automotive)

Elevated concentrations of cadmium, chromium, lead and mercury were detected in the stained, shallow (0-1.5 feet) fill material at Darko's Automotive. These soils were not detected below 4 feet and are resting on naturally-occurring clay. The areal distribution of the discolored soils on Parcel 43 is unknown (WALSH, 1991b). A summary of the 1991 data is found in Appendix 5.4.

PCE (2 ug/L) was detected in the ground water from TH-14 in 1991 (Table 10). The source of the contamination is unknown.

Parcel 99 (Lambert storage building)

Total RCRA-8 metal concentration in soils was within regional and local ranges for TH-24 (Table 4) and TH-12 (WALSH, 1991b).

SVOCs totaling 1,750 ug/Kg were detected in the soil sample from TH-24 (Table 6). SVOCs were also detected in the shallow soils from TH-12 (WALSH, 1991a). These SVOCs are likely the result of incomplete combustion and do not pose a significant health or safety risk.

TEPH was detected in the shallow samples in TH-24 (17,000 ug/Kg, Table 7) but was not detected in the sample from the 30-31.5 foot interval. The source of the diesel-range fuel contamination in soils on Parcel 99 is likely due to the operational practices at the automobile repair shops which formerly existed at the site.

No BTEX compounds were detected in the soil samples from TH-24, although MTBE was detected at 12 ug/Kg in the sample from 5 to 6.5 feet (Table 7). The source of the MTBE in the soil is unknown but may be related to operator practices at the automobile repair facilities that occupied the site at various times between 1956 and 1994.

Total volatile petroleum hydrocarbons totaling 1,100 ug/L were measured in the ground water in TH-24 (Table 11). No volatile petroleum hydrocarbons were detected in TH-12 (WALSH, 1991) which was drilled 40 feet southwest of TH-24. The source of the TVPH in TH-24 may be the suspected floor drain sand trap from the garage on Parcel 99, or it may have originated at an unknown, up-gradient location.

PCE was detected in the ground water from TH-24 at 530 ug/L (Table 9). This concentration is considerably above the MCL for this compound (5 ug/L). PCE (2 ug/L) and 1,1,1-trichloroethane (2 ug/L) was detected in the ground water from TH-12 in 1991 (Table 10). The source of the PCE is unknown, but may be related to a suspected floor drain sand trap near the west side of the structure. There may also be an unregistered leaking UST on the site. Alternatively, the source could be to the southeast from an unknown up-gradient location.

Parcel 54 (Lambert Auto Parts)

Significant TVPH contamination (276,470 ug/L) was documented in 1991 from TH-13 which was drilled immediately down-gradient of the former UST at Lambert Auto Parts (WALSH, 1991b). Lambert Auto parts occupies the site of a former gasoline station, the presumed source of the contamination. Metals in ground water and soils were within regional limits. SVOCs in soils consisted of common combustion and petroleum degradation products which pose no significant health or safety risk.

Parcels 55 (Lambert Automobile Electronics) and 56 (Lambert paved parking lot)

TH-25 was drilled near the southeast corner of the parcel. Total RCRA-8 metals in soils were within regional and local ranges (TH-25, Table 4).

TEPH (4,400 ug/Kg) was detected in the soil sample from 5-6.5 feet in TH-25 but was not detected in the deeper sample (25-31.5 foot interval) (Table 7). Low concentrations of toluene (18 ug/Kg), ethylbenzene (6.1 ug/Kg), and total xylenes (34 ug/Kg) were detected in the shallow soil sample (5-6.5 foot interval) from TH-25, but were absent in the sample from 25-31.5 feet (Table 7).

The fuel contamination in soils in TH-25 could be due to leakage from the UST which was removed from the adjoining Lambert Auto Parts (Parcel 54) or from the UST which was shown on the Sanborn Insurance maps and may exist under the present Brighton Boulevard.

No volatile petroleum compounds were detected in the ground water from TH-25 (Table 10).

TH-11 was drilled in 1991 near the northwest corner of the parcel and down-gradient from a removed waste oil tank and four in-service hydraulic oil USTs. No significant soil contamination was detected. No volatile petroleum hydrocarbons were detected in the ground water (Table 12). DCE (2 ug/L) and 1,1,1-TCA (2 ug/L) was detected in the ground water. These concentrations are below the Colorado MCLs for these compounds. The source of the chlorinated compounds is unknown, but may have originated from the waste oil tank. An off-site source is also a possibility.

Parcel 46 (Hydraulic Equipment Repair)

Discolored soils were identified to the 2-foot level on Parcel 46 (Hydraulic Equipment Repair) in TH-15 (WALSH, 1991). This material contains lead (170 mg/Kg) and arsenic (7.0 ppm), PAHs and oil. A 3-foot thick layer of naturally-occurring clay below the contaminated soils may provide a barrier to vertical contaminant migration. The extent of this black fill material is unknown. Bulk petroleum products were once stored on this site (14 ASTs and 3 USTs) and are the probable source of this soil contamination.

Total metal concentrations in the soil sample from TH-06 were within regional and local ranges. The sample from the black fill material in TH-15 contained arsenic (7.0 ppm) and lead (170 ppm) at levels which are slightly above the regional ranges. The source of the metal contamination is also probably the bulk petroleum storage, although the hydraulic repair facility could also be a contributor. The extent of the metal, PAHs and oil contaminated soil is unknown, but is probably limited in vertical extent by a layer of clay at approximately 3 feet below the surface.

No VOCs were detected in the soil samples from either well. No SVOCs were detected in the soil sample from TH-06, but petroleum, mainly oils, at approximately 200 ppm was measured in TH-15. Other SVOCs (approximately 1.3 ppm), apparently fuel combustion products, were also detected in the soil from TH-15. The bulk oil storage facility is the likely source of these SVOCs.

No volatile petroleum hydrocarbons were detected in the ground water from either TH-06 or TH-15 (WALSH, 1991b). Solvents were detected in the ground water from both wells. PCE (4 ug/L), DCM (20 ug/L) and 1,1,1-TCA (8 ug/L) were detected in both wells. PCE (2 ug/L) and 1,1,1-TCA (8 ug/L) were detected in TH-15. No SVOCs were detected in the ground water from either well. Total dissolved metals were within MCLs for both wells.

Table 4 Soil Concentrations of Metals (mg/Kg) and Typical Local and Regional Ranges - Humboldt/44TH Streets to Brighton Boulevard (WALSH 1998 Test Holes)

Metal	CDOT Mean[1]	CDOT Range	Western U.S. Range[2]	U.S. Typical Range[3]	TH-19	TH-20	TH-21	TH-22	TH-23	TH-24	TH-25
Arsenic	5.5	ND[5]-13	0.1-40	1-40	7.6	7.1	ND	ND	6.4	11	6.9
Barium	563	13-1000	100-3000	100-3000	100	53	24	29	33	150	62
Cadmium	1.83	ND-6	0.01-2	0.01-7	ND	ND	ND	ND	ND	ND	ND
Chromium	12.5	ND-14	5-1500	5-3000	8.7	5.7	2.5	3.2	3.9	12	5.8
Lead	33	1.8-80	2-300	2-200	7.3	ND	ND	5.6	ND	32	53
Mercury	< DL[4]-(0.1)	ND-0.2	0.01-0.055	0.01-0.08	ND	ND	ND	ND	ND	0.13	ND
Selenium	< DL-(10)	ND-2	0.01-12	0.1-2	ND	ND	ND	ND	ND	ND	ND
Silver	< DL-(1)	ND-1	0.01-8	0.1-5	ND	ND	ND	ND	ND	ND	ND

(1) Calculated from 71 soil samples collected from CDOT projects in the Denver Metro Area.
(2) Bowen, 1979
(3) Dragun, 1988
(4) Detection Limit
(5) Not Detected
Bold numbers exceed U.S. Typical Ranges or local CDOT ranges for a particular metal.

Table 5 Soil Concentrations of Metals (mg/Kg) and Typical Local and Regional Ranges - Humboldt/44TH Streets to Brighton Boulevard (WALSH 1998 GeoProbe Soil Samples)

Metal	CDOT Mean[1]	CDOT Range	Western U.S. Range[2]	U.S. Typical Range[3]	Location and Sample Depth (Feet)				
					GP-1 (1.9-2.9) black fill	GP-1 (1.9-10.0) bl. fill excl.	GP-2 (3-10)	GP-3 (4-10)	GP-4 (2.5-10.0)
Arsenic	5.5	ND[5]-13	0.1-40	1-40	**93** (ND)	6.3	ND	ND	ND
Barium	563	13-1000	100-3000	100-3000	800	70	4.7	24	12
Cadmium	1.83	ND-6	0.01-2	0.01-7	3.1	ND	ND	ND	ND
Chromium	12.5	ND-14	5-1500	5-3000	10	7.1	ND	2.0	1.8
Lead	33	1.8-80	2-300	2-200	**970** (0.24)	ND	ND	ND	ND
Mercury	<DL[4]-(0.1)	ND-0.2	0.01-0.055	0.01-0.08	ND	ND	ND	ND	ND
Selenium	<DL-(10)	ND-2	0.01-12	0.1-2	ND	ND	ND	ND	ND
Silver	<DL-(1)	ND-1	0.01-8	0.1-5	**4.3**	ND	ND	ND	ND

(1) Calculated from 71 soil samples collected from CDOT projects in the Denver Metro Area.
(2) Bowen, 1979
(3) Dragun, 1988
(4) Detection Limit
(5) Not Detected
Bold numbers exceed U.S. Typical Ranges or local CDOT ranges for a particular metal.
TCLP results in parentheses.

Table 6 SVOCs in Soils (ug/Kg) - Humboldt/44TH Streets to Brighton Boulevard

Compound	Location						
	TH-19	TH-20	TH-21	TH-22	TH-23	TH-24	GP-4
Benzo[a]pyrene	ND	ND	ND	ND	ND	330	ND
Benzo[b]fluoranthene	ND	ND	ND	ND	ND	330	ND
2,6-Dinitrotoluene	500	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	ND	ND	510	ND
Pyrene	ND	ND	ND	ND	ND	580	ND
Unknown Multi-ringed Aromatic	ND	ND	ND	ND	ND	170 T	ND
Sulfur, Molecular	ND	1,900 T	ND	ND	ND	ND	ND

Concentrations in ug/Kg (parts per billion).
ND = not detected
T = Tentatively Identified Compound by mass spectrum

Table 7 Concentration of Petroleum Hydrocarbons in Soil (ug/Kg) - Humboldt/44TH Streets to Brighton Boulevard, WALSH 1998 Test Holes

	Location and Depth (Feet)													
Analyte	**TH-19** (5-6.5)	**TH-19** (30-31.5)	**TH-20** (30-31.5)	**TH-20** (35-36.5)	**TH-21** (5-6.5)	**TH-21** (30-31.5)	**TH-22** (10-11.5)	**TH-22** (30-31.5)	**TH-23** (5-6.5)	**TH-23** (30-31.5)	**TH-24** (5-6.5)	**TH-24** (25-31.5)	**TH-25** (5-6.5)	**TH-25** (25-31.5)
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1	ND
Total Xylenes	ND	5.6	ND	ND	ND	340	ND	5.1	ND	ND	ND	ND	34	ND
BTEX	ND	17.6	ND	ND	ND	340	ND	5.1	ND	ND	ND	ND	58.1	ND
MTBE	ND	ND	ND	9.0	ND	1,200	ND	8.7	9.3	8.6	12	ND	ND	ND
TVPH	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TEPH	ND	ND	ND	ND	3,100	ND	ND	ND	ND	ND	17,000	ND	4,400	ND

Bold values exceed Remedial Action Category I (RAC I) standards established by the CDPHE for soils affected by leaking underground storage tanks (USTs) (CDH, 1992).

Table 8 Concentration of Petroleum Hydrocarbons in Soil (ug/Kg) - Geoprobe Soil Samples					
Analyte	Location and Depth (Feet)				
	GP-1 (1.9-2.9)	GP-1 (1.9-10.0)	GP-2 (3-10)	GP-3 (4-10)	GP-4 (2.5-10.0)
Benzene	6.6 J	ND UJ	ND U	ND U	ND U
Toluene	ND UJ	ND UJ	ND U	ND U	ND U
Ethylbenzene	6.3 J	ND UJ	ND U	ND U	ND U
Total Xylenes	11 J	ND UJ	ND U	ND U	ND U
BTEX	23.9	ND	ND	ND	ND
MTBE	94 J	48 J	ND U	ND U	ND U
TVPH	ND UJ	ND UJ	ND U	ND U	ND U
TEPH	13,000	ND U	ND U	ND U	ND U

ND = Not Detected
U = Compound was searched for but not detected at or above the method detection limit.
J = Compound was identified out of the method working limits and should be considered an estimated value.

Table 9 Volatile Organic Compounds in Ground Water (ug/L), 1998 WALSH Test Holes						
Compound	TH-19	TH-20	TH-21	TH-22	TH-23	TH-24
Tetrachloroethene	**140**	**8.1**	**7.8**	**19**	**31**	**530**
Methylene Chloride	ND	ND	**12**	**17**	ND	ND
Unknown Conjugated Compound	8.6 T	ND	ND	ND	ND	ND

Bold values exceed the CDPHE MCLs for the respective compound.
"T" = Tentatively identified compound

Table 10 Chlorinated Solvents in Ground Water (ug/L), 1991 WALSH Test Holes								
Compound	**TH-6**	**TH-9**	**TH-11**	**TH-12**	**TH-14**	**TH-15**	**TH-16**	**TH-18**
Tetrachloroethene	4 J	**6**	2 J	2 J	2 J	2 J	2 J	5
Methylene Chloride	20 B	ND	ND	ND	ND	ND	ND	ND
1, 1, 1-Trichloroethane	8	ND	6	2 J	ND	8	ND	ND

Bold values exceed the CDPHE MCLs for the compound.
"J" = Judged value
"B" = Indicates that the compound was found in the method blank and has been corrected.
ND = Not Detected

Table 11 TVPH in Ground Water (ug/L), WALSH 1998 Test Holes							
Location	**TH-19**	**TH-20**	**TH-21**	**TH-22**	**TH-23**	**TH-24**	**TH-25**
Concentration	ND	ND	ND	ND	ND	1,100	ND

ND = Not Detected

Table 12 TVPH in Ground Water (ug/L), WALSH 1991 Test Holes	
Location	**Concentration**
TH-6	ND
TH-7	1,964
TH-9	78
TH-10	58,360
TH-10 (1998)	(770)
TH-11	ND
TH-12	ND
TH-13	276,470
TH-14	32
TH-15	ND
TH-16	5
TH-16 (1998)	(740)
TH-18	890
TH-18 (1998)	(ND)

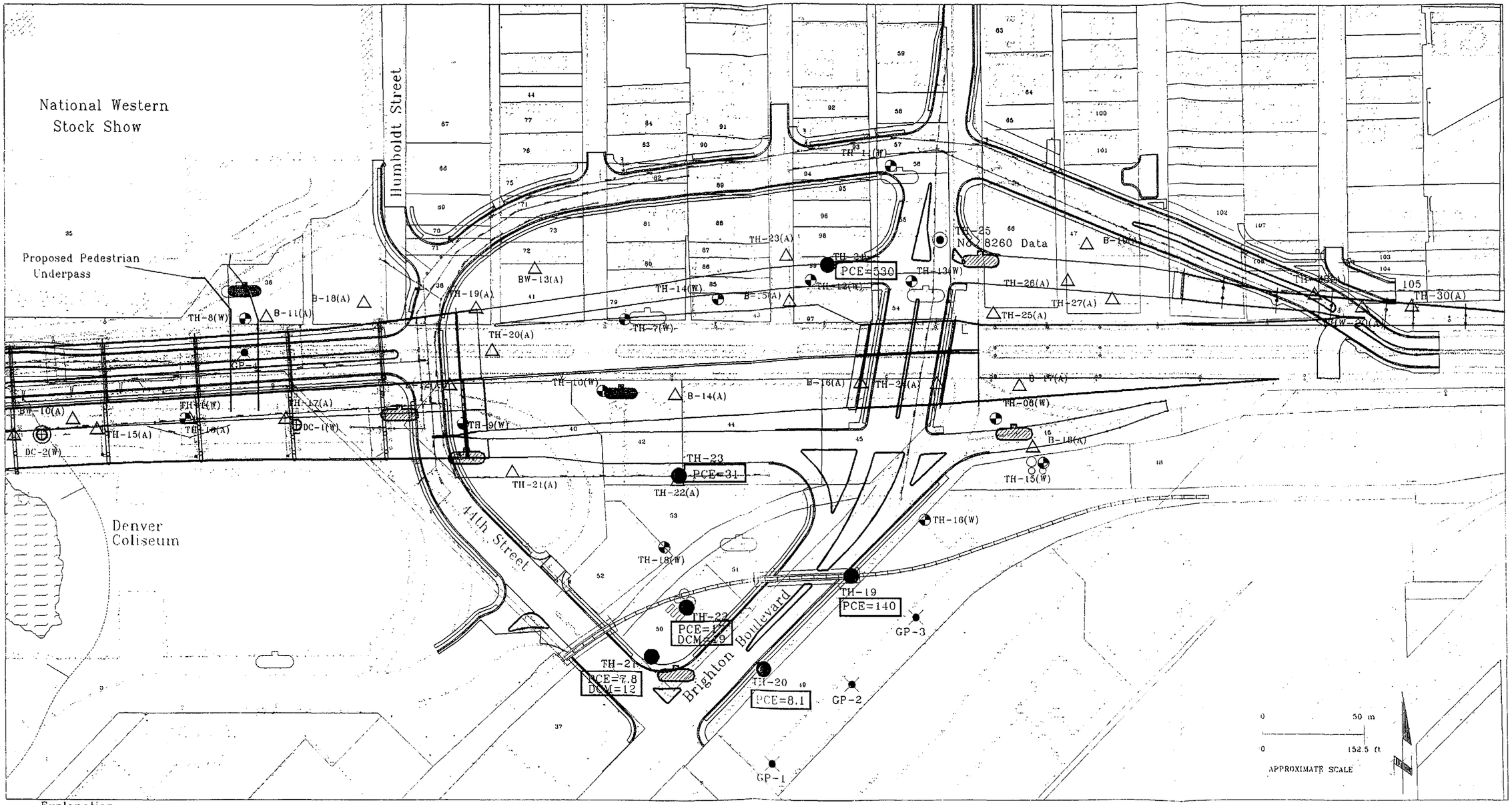
ND = Not Detected
1998 results in parentheses.

Table 13 Concentration of Metals in Groundwater (mg/L), WALSH 1998 Test Holes								
Metal	TH-19	TH-20	TH-21	TH-22	TH-23	TH-24	TH-25	CGWS[1] (mg/L)
Arsenic	ND	ND	ND	ND	ND	ND	ND	0.05
Barium	0.049	0.046	0.057	0.051	0.055	0.055	0.045	1.0
Cadmium	ND	ND	ND	ND	ND	ND	ND	0.005
Chromium	ND	ND	ND	ND	ND	ND	ND	0.05
Lead	ND	ND	ND	ND	ND	ND	ND	0.05
Mercury	ND	ND	ND	ND	ND	ND	ND	0.002
Selenium	ND	ND	ND	ND	ND	ND	ND	0.01
Silver	ND	ND	ND	ND	ND	ND	ND	0.05

[1] = Colorado Ground Water Standards, Human Health Standards (CDH, 1995). Bold values exceed CGWSs.
ND = not detected

9.3.3 Discharge Parameter Results

Dewatering in the Phase II and III construction areas may be necessary for retaining wall foundations and other relatively deep (greater than 27 feet below ground level) excavations. Discharge parameter data was not collected in 1998 because the 1991 data was deemed sufficient for the area. In general, the total suspended solids (TSS) and gross alpha radiation levels exceed the Colorado standards for the discharge of ground water. Ground water may also require treatment to remove petroleum and chlorinated hydrocarbons (PCE, TCA and DCM) before discharge. A summary of the discharge parameter results from the WALSH 1991 monitor wells in the Phase II and III areas is included in Appendix 6.0.



Explanation

- Washington Street Shallow Soil Boring (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997) Completed as Monitor Wells
- Walsh Monitor Well (1991)
- Aguirre Geotechnical Hole (1994,1995)
- Walsh Geoprobe Soil Sample Site, 1998
- Walsh Test Hole, 1998
- 33 Approximate Property Boundary and ID Number
- Former Aboveground Storage Tank(s)
- Excavated Area (1948 Air Photo)
- Former Barrel Storage
- Former Underground Storage Tank(s)
- Underground Storage Tank(s) - Removal Unknown
- Underground Storage Tank(s)
- Approximate Location of Former Gas Station Tank Type (UST or AST) Unknown, UST Removal Unknown
- Chlorinated Solvents (µg/L (ppb))
- Exceeds MCLs (µg/L (ppb))
  Compounds in red exceed MCLs
- Proposed sidewalks and riprap
- Proposed curbs and gutters
- Proposed retaining walls
- Proposed storm and/or sanitary sewers
- Proposed gas
- Proposed telephone
- Proposed water line

Walsh

Environmental Scientists and Engineers, Inc.

VOLATILE ORGANIC COMPOUNDS IN GROUND WATER, EAST OF HUMBOLT STREET

Humbolt/44th Street to Brighton Boulevard

Job 3008-020 | Date 6/98 | Figure 5

3008m01b.dwg 6/25/98 PB

10 Conclusions and Recommendations

Soil and ground water contamination and USTs have been identified in the Phase II and III construction areas (WALSH 1991b, 1992, 1996, this report). These environmental problems will require that the CDOT implement special precautions to protect worker and public health and will require some specific actions to ensure tanks and contaminated materials are properly handled. Figure 6 illustrates the general outline of known environmental concerns in the Phase II and III construction areas. The areas of concern depicted on Figure 6 are approximate and interpretive. Residential areas south of East 47th Avenue have not been investigated in detail but are believed to represent a relatively low probability of contamination.

- Ground water from all of the test holes drilled in 1998 in the Phase II and III construction areas is contaminated with PCE, and in places with methylene chloride, at concentrations which exceed the MCLs for these compounds. The greatest concentration of PCE was detected in TH-24 (530 ug/L) on Parcel 99. Substantial PCE was also detected in TH-19 on Parcel 49 (140 ug/L). Methylene chloride above the MCL was detected in TH-21 and TH-22 at 12 and 17 ug/L, respectively. PCE contamination was widespread in 1991, but only exceeded the MCL in one location (TH-09, 6 ug/L). Either multiple sources of contamination exist within the study area, or a large plume of PCE has migrated into the area from unknown up-gradient location(s).

- Black fill material containing elevated concentrations of lead and arsenic, presumably composed in part of smelter wastes from the Omaha and Grant Smelter, was discovered near the southeast corner of Parcel 49 (Central Storage). This fill material was also contaminated with petroleum compounds. Discolored fill material containing metals, PAHs and oil was previously detected on Parcel 43 (Darko's Automotive) and Parcel 46 (Hydraulic Equipment Repair).

- Fuel constituents were noted in soils from all of the test holes drilled in 1998, but at levels which do not exceed RAC I remediation levels. Volatile petroleum compounds were found in the ground water from TH-24 (Parcel 99, Lambert storage building), TH-10 (Parcel 42, O G Valentine Lumber) and TH-16 (Parcel 49, Central Storage).

- An underground storage tank is known to exist on Parcel 42 (O G Valentine Lumber) and down- and up-gradient test holes suggest that this tank may be contributing to the contamination noted in TH-07 and TH-10. USTs may also be present up-gradient to Parcel 50 (Western Boom), Parcel 54 (Lambert Auto Parts), Parcel 55 (Lambert Automobile Electronics), and Parcel 46 (Hydraulic Equipment Repair). Known USTs are present on Parcel 55 (Lambert Automobile Electronics).

- Discharge parameter results indicate that ground water will exceed allowable limits for total suspended solids (TSS). Settling or flocculation will be required to remove excessive

TSS. Treatment or a permit variance will also be necessary for the elevated gross alpha and beta radiation. The radiation values are not unusual for sites along the Front Range.

- Barium was the only RCRA-8 metal detected in the 1998 ground water samples from the Phase II and III construction area. The concentration did not exceed the MCLs.

- Ground water flow direction in the Phase II and III construction areas is to the northwest, that is, towards the South Platte River. Depth to ground water is generally between 27 and 31 feet over most of the investigation area.

10.1 Parcel 49 (Central Storage)

Black fill material, presumably composed of smelter waste, was found beneath the concrete covered parking area to the east of the Central Storage structure in GP-1. This material was only detected in the southernmost of the three Geoprobe soil sample sites and was not detected in the three test holes that have been drilled on Parcel 49. The black fill material has concentrations of arsenic, lead, and silver above the regional ranges. The fill material also contained BTEX compounds, MTBE, and diesel-range petroleum hydrocarbons (TEPH).

This fill material contains lead above the usual "action level" limits (500 mg/Kg) for an urban industrial area. The black fill material was submitted for TCLP metals analysis and the results indicate that the material is not a hazardous waste by characteristics according to RCRA.

- WALSH recommends that the black fill material be segregated from other soils and treated as a special waste for disposal purposes. Dust suppression methods and proper PPE (gloves) should be employed to reduce worker exposure and limit the spread of the metal-bearing fill.

Black-colored soil, believed to be petroleum contaminated, was noted in TH-19 at the 6 to 6.3-foot interval. The analytical results from this interval were non-detect for petroleum contamination; total metals were within regional limits. Staining and a slight hydrocarbon odor was also noted in the 35 to 36-foot level in TH-20. MTBE (9 ug/Kg) was the only petroleum–associated contaminant detected from the soil at this level.

- WALSH recommends that as a precautionary measure, stained soils excavated from Parcel 49 should be assumed to be contaminated with metals and treated as special waste for disposal purposes.

Ground water in TH-16 contains volatile petroleum hydrocarbons (770 ug/L) and in 1991 contained PCE (2 ug/L) and MTBE (5 ug/L). Ground water in TH-19 and TH-20 contains PCE above the MCL. The source of this contamination is unknown.

- WALSH recommends that ground water removed from deep excavations on this parcel be treated to remove petroleum and chlorinated hydrocarbons prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

- WALSH recommends that the CDOT inform the CDPHE of the discovery of high concentrations of chlorinated solvents in the ground water in the Phase II and III construction areas.

10.2 Parcel 50 (Western Boom)

Minor petroleum contamination was detected in soil samples from this parcel. MTBE was detected at 1,200 ug/Kg in the soils in TH-21. The source of the MTBE is not known. The known usage history of this parcel suggests that the MTBE may be related to an off-site source. The bulk storage ASTs and USTs which once existed on the property were removed prior to the widespread introduction of MTBE to the Front Range area. The low level of petroleum contamination in the soil samples from TH-21 (with the exception of MTBE) suggests that the UST indicated to exist near the south apex of the property has been removed (Sanborn Insurance maps for 1945 and 1958, WALSH, 1991b).

- WALSH recommends that construction personnel remain alert to the possible presence of petroleum contaminated soils and USTs on this parcel. If contamination is detected, then the appropriate PPE and screening measures outlined in the Material Management Plan (MMP) will take affect.

Ground water samples from the test holes on this parcel contain PCE and DCM at levels which exceed the MCLs. The source of the contamination is unknown.

- WALSH recommends that the ground water on this parcel be treated to remove PCE and DCM prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

10.3 Parcels 52 and 53 (Unpaved parking lot and vacant storage lot)

SVOCs (8,200 ug/Kg) were detected in soils from TH-18, which was drilled in 1991 on the property boundary between Parcels 53 and 52. The SVOCs are not considered to be significant health or environmental risks. The source of the SVOCs is unknown but could be attributable to incomplete combustion products from fuels, spillage or infiltration of materials stored at the site, or a component of the fill material used to bring the parcel to grade.

- WALSH recommends that workers remain alert to the presence of petroleum-contaminated soils on these parcels. If these soils are uncovered they should be segregated and tested to determine the proper disposal method. Workers should wear proper PPE to reduce exposure to the soils and dust suppression methods should be employed.

No volatile or extractable petroleum hydrocarbons were detected in the ground water from TH-18 in 1998 although the 1991 results indicated a TVPH level of 890 ug/L (WALSH, 1992). The difference in these values suggests migration of a petroleum plume over the area or natural attenuation of an existing plume.

PCE (5 ug/L) and MTBE (890 ug/L) were also detected in the ground water in 1991. The MCL for PCE is 5 ug/L; there is no established MCL for MTBE. The source of these compounds is unknown.

- WALSH recommends that the ground water on this parcel be treated to remove PCE and DCM prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

10.4 Parcel 42 (O G Valentine Lumber)

TH-23 was drilled along the proposed route of a sewer line. Fuel constituent contamination in soils was minimal; only low concentrations of MTBE was detected. The lack of significant fuel contamination in soil and ground water suggests that the unused UST on the north side of Parcel 42 is the source of the contamination noted in TH-10.

PCE, at concentrations above the MCL, was detected in the ground water from TH-23. The source of the contamination is unknown, but may have resulted from spillage along the adjacent railroad tracks, operational practices by the property owner, or migration onsite of an up-gradient contamination plume.

- WALSH recommends that any produced ground water in the vicinity of TH-23 be adequately treated to remove PCE before discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

TH-10 was drilled in 1991 in a down-gradient position to a unused dispenser and UST which was located near the north side and adjacent to the foundation of the O G Valentine Lumber building. Some soil contamination was noted near the ground water table. The extent of the soil contamination on Parcel 42 is unknown, but may extend beyond the property limits.

- WALSH recommends that petroleum-contaminated soils be segregated and placed on plastic, bermed and covered with plastic sheeting pending testing for proper disposal. Proper PPE equipment should be worn by the construction personnel to minimize contact with contaminated soil.

The concentration of total volatile petroleum hydrocarbons in ground water decreased dramatically in TH-10 from the initial sampling in 1991 to 1998. This decrease may be attributable to natural attenuation and degradation of the petroleum contamination.

Remediation efforts on Parcel 79 (Denver Fire Station #9) may also have contributed to the decrease in TVPH by creating an increased gradient of relatively oxygenated ground water across Parcel 42. The extent of the plume originating on Parcel 42 has been documented by the environmental firms engaged to remediate Parcel 79 and is depicted on Figure 6. No chlorinated hydrocarbons were detected in TH-10 in 1991.

- WALSH recommends that any ground water produced in the vicinity of TH-10 be treated to remove petroleum hydrocarbons. In addition, the widespread presence of PCE and other chlorinated compounds in the vicinity of TH-10 indicates that ground water should also be treated to remove solvents. Workers should wear proper PPE to minimize contact with the ground water.

10.5 Parcel 79 (Denver Fire Station #9)

TH-7 was drilled slightly up-gradient to an UST containing diesel fuel. Benzene was detected in concentrations above the MCL. Subsequent remediation of this site has resulted in benzene levels near the MCL.

- WALSH recommends that any ground water produced from Parcel 79 be treated to remove petroleum hydrocarbons before discharge. In addition, the widespread presence of PCE and other chlorinated compounds in the vicinity of TH-7 indicates that ground water should also be treated to remove solvents. Workers should wear proper PPE to minimize contact with the ground water.

Utilities and the fire station foundation prevented complete removal of diesel-contaminated soil from the vicinity of the UST when it was removed in 1991. The extent of the remaining contaminated soil is unknown, but is likely largely confined to the property and the vicinity of the structure.

- Soils with visible petroleum contamination, that exhibit headspace PID readings or have a hydrocarbon odor should be segregated, placed on plastic, bermed and covered with plastic sheeting pending analysis and proper disposal. Workers should wear appropriate PPE to minimize contact with the soil.

10.6 Parcel 43 (Darko's Automotive)

Black discolored soils were detected in the shallow subsurface on Parcel 43, currently occupied by Darko's Automotive. These soils were not detected below 4 feet and rest on naturally-occurring clay. The areal distribution of the discolored soils on Parcel 43 is unknown.

- WALSH recommends that discolored soils excavated from Parcel 43 should be segregated and treated as a special waste for disposal purposes. Dust suppression and proper PPE should be worn to minimize contact with the contaminated soils.

PCE (2 ug/L) was detected in ground water from this parcel in 1991. The source of the contamination is not known: it may be related to operational practices on the site or have an off-site source.

- WALSH recommends that the ground water on this parcel be treated to remove PCE and petroleum contamination prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

10.7 Parcel 99 (Lambert storage building)

PCE, greatly in excess of the MCL, was detected in the ground water from TH-24. PCE and 1,1,1-trichloroethane (TCA) were detected in the ground water from TH-12 in 1991. The source of the PCE is unknown, but may be related to a suspected floor drain sand trap near the west side of the structure. Alternatively, the source could be an unregistered leaking UST on the site or an unknown, off-site and up-gradient source.

- WALSH recommends that the ground water on this parcel be treated to remove PCE and 1,1,1-TCA and petroleum contamination prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

- Soils with visible petroleum contamination, that exhibit headspace PID readings or have a hydrocarbon odor should be segregated, placed on plastic, bermed and covered with plastic sheeting pending analysis and proper disposal. Workers should wear appropriate PPE to minimize contact with the soil.

10.8 Parcel 54 (Lambert Auto Parts)

TH-13 was drilled down-gradient from a former service with two USTs (removed). Total volatile hydrocarbons were detected in the ground water (230 ppm) and soil near the water table (490 ppm) from this well. Soil near the water table was discolored. The extent of any petroleum contaminated soils under the current structure is unknown. USTs may also exist under the structure.

- Soils with visible petroleum contamination, that exhibit headspace PID readings or have a hydrocarbon odor should be segregated, placed on plastic, bermed and covered with plastic sheeting pending analysis and proper disposal. Workers should wear appropriate PPE to minimize contact with the soil.

- Construction contractors should be aware that USTs may exist under the present structure near the frontage with East 46th Avenue.

- WALSH recommends that any ground water produced in the vicinity of TH-13 be treated to remove petroleum hydrocarbons. In addition, the widespread presence of PCE and other chlorinated compounds in the vicinity of TH-13 indicates that ground water should also be treated to remove solvents. Workers should wear proper PPE to minimize contact with the ground water.

10.9 Parcels 55 (Lambert Automobile Electronics) and 56 (Lambert paved parking lot)

Low concentrations of BTEX compounds (58 ppb) and extractable petroleum hydrocarbons (4.4 ppm) were detected in the shallow soils in TH-25, drilled near the southeast corner of the parcel. The low level of petroleum contamination suggests that little leakage has occurred from an UST which may exist down-gradient in the present Brighton Boulevard.

- WALSH recommends that contractors should be informed of the possible presence of USTs near the Brighton Boulevard property frontage.

PCE and 1,1,1-TCA was detected at concentrations below the MCLs in TH-11 which was drilled near the northwest corner of the property in 1991. At least four USTs are still in place on the property (hydraulic oil tanks) and oil contaminated soils may exist under the structure.

- Soils with visible petroleum contamination, that exhibit headspace PID readings or have a hydrocarbon odor should be segregated, placed on plastic, bermed and covered with plastic sheeting pending analysis and proper disposal. Workers should wear appropriate PPE to minimize contact with the soil.

- WALSH recommends that the ground water on this parcel be treated to remove PCE, 1,1,1-TCA and petroleum contamination prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.

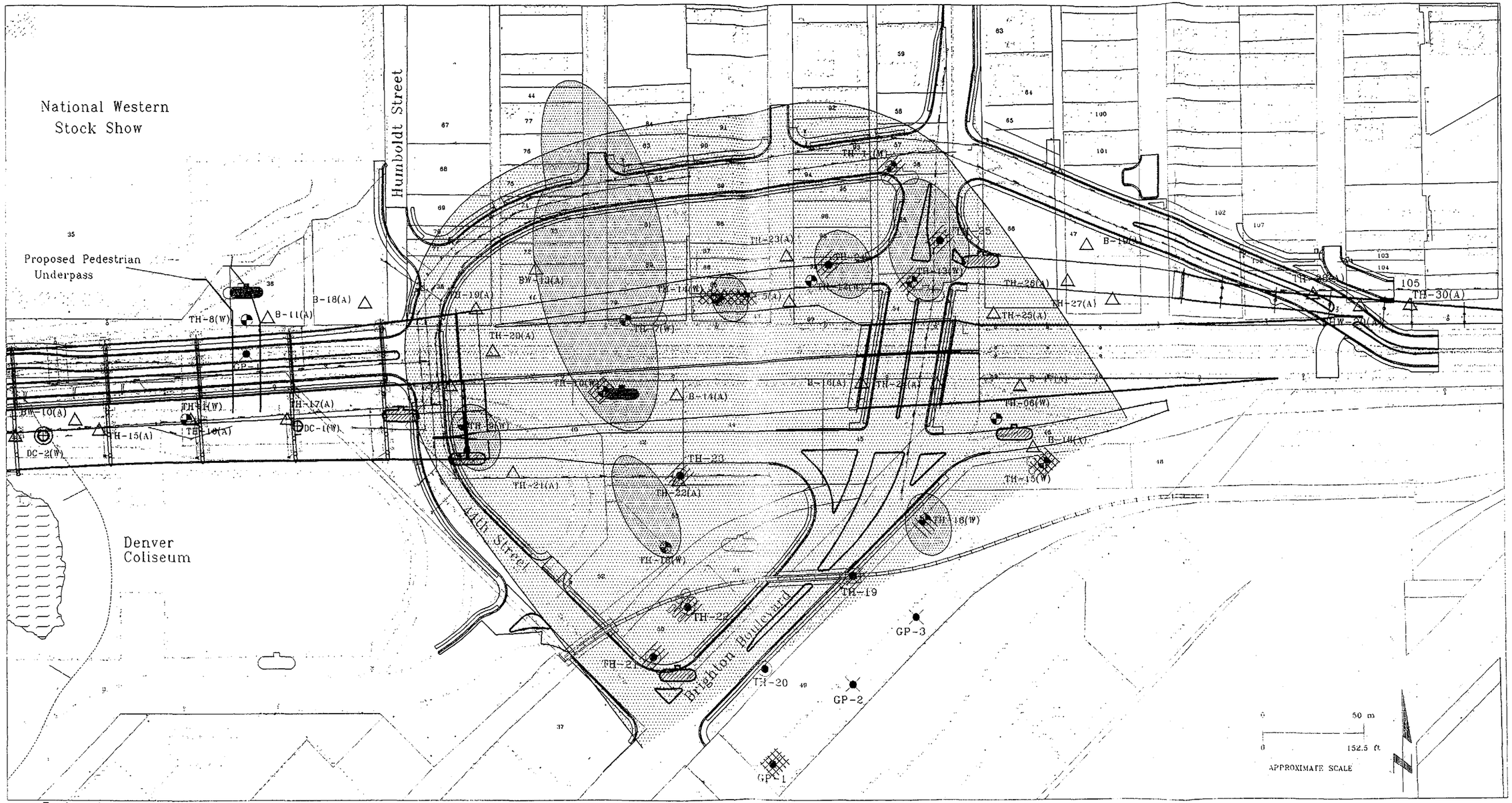
10.10 Parcel 46 (Hydraulic Equipment Repair)

Discolored soils were identified to the 2-foot level on Parcel 46 (Hydraulic Equipment Repair) in TH-15. This material contains lead, arsenic, PAHs and oil. A 3-foot thick layer of naturally-occurring clay below the contaminated soils may provide a barrier to vertical contaminant migration. The extent of this black soil is unknown.

- WALSH recommends that discolored soils excavated from Parcel 46 should be segregated and treated as a special waste for disposal purposes. Dust suppression methods should be employed and worker should wear appropriate PPE to minimize contact with the soil.

Ground water recovered from TH-06 in 1991 contained PCE, TCA, and DCM. The concentration of DCM was above the MCL. PCE and MTBE was also detected in TH-15, up-gradient to TH-06. The source of the solvent contamination is unknown.

- WALSH recommends that the ground water on this parcel be treated to remove PCE, TCA, DCM and petroleum contamination prior to discharge. Workers should wear appropriate PPE to minimize contact with the ground water.



Explanation

- Washington Street Shallow Soil Boring (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997)
- Denver Coliseum Area Test Holes (Walsh, 1997) Completed as Monitor Wells
- Walsh Monitor Well (1991)
- Aguirre Geotechnical Hole (1994,1995)
- Walsh Geoprobe Soil Sample Site, 1998
- Walsh Test Hole, 1998
- 33 Approximate Property Boundary and ID Number
- Former Aboveground Storage Tank(s)
- Excavated Area (1948 Air Photo)
- Former Barrel Storage
- Former Underground Storage Tank(s)
- Underground Storage Tank(s) - Removal Unknown
- Underground Storage Tank(s)
- Approximate Location of Former Gas Station Tank Type (UST or AST) Unknown, UST Removal Unknown
- Ground Water Contaminated with Chlorinated Solivents
- Ground Water Contaminated with Petroleum Compounds
- Soil Contaminated with Metals
- Soil Contaminated with Petroleum Compounds (All Limits are Approximate)
- Proposed sidewalks and riprap
- Proposed curbs and gutters
- Proposed retaining walls
- Proposed storm and/or sanitary sewers
- Proposed gas
- Proposed telephone
- Proposed water line

Walsh

Environmental Scientists and Engineers, Inc.

ENVIRONMENTAL CONCERNS
PHASE II AND PHASE III CONSTRUCTION
Humbolt/44th Street to Brighton Boulevard

Job 3008-020	Date 6/98	Figure 6

3008m01b.dwg 6/25/98 PB

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APPENDIX 1.0

SAMPLE SUMMARY TABLE AND FIELD SCREENING MEASUREMENTS OF TEST HOLE SAMPLES

APPENDIX 1.0

IDENTIFICATION OF SAMPLES AND ANALYSES PERFORMED

Location	Date of Sampling	Tag Number	Medium (Soil Sampling Interval in Feet)	Analysis
Soil Samples				
TH-19	05-11-98	66597	Soil (5 - 6.5)	BTEX/MTBE, TVPH. TEPH
TH-19	05-11-98	66598	Soil (30-31.5)	BTEX/MTBE, TVPH. TEPH
TH-19	05-11-98	66608	Soil (Composite 5-31.5)	SVOCs (8270)
TH-19	05-11-98	66599	Soil (Composite 5-31.5)	VOCs (8260)
TH-19	05-11-98	66609	Soil (Composite 5-31.5)	Total RCRA-8 Metals
TH-20	05-11-98	66595	Soil (Composite 5-36.5)	Total RCRA-8 Metals
TH-20	05-11-98	66596	Soil (Composite 5-36.5)	SVOCs (8270)
TH-20	05-11-98	66593	Soil (30-30.5)	BTEX/MTBE, TVPH. TEPH
TH-20	05-11-98	66594	Soil (35-36.5)	BTEX/MTBE, TVPH. TEPH
TH-21	05-11-98	66613	Soil (Composite 5-36)	Total RCRA-8 Metals
TH-21	05-11-98	66614	Soil (Composite 5-36)	SVOCs (8270)
TH-21	05-11-98	66612	Soil (5-6.5)	BTEX/MTBE, TVPH. TEPH
TH-21	05-11-98	66615	Soil (30-31.2)	BTEX/MTBE, TVPH. TEPH
TH-22	05-12-98	66602	Soil (Composite 5-36.5)	Total RCRA-8 Metals
TH-22	05-12-98	66603	Soil (Composite 5-36.5)	VOCs (8260)
TH-22	05-12-98	66604	Soil (Composite 5-36.5)	SVOCs (8270)
TH-22	05-12-98	66600	Soil (10-11.5)	BTEX/MTBE, TVPH. TEPH
TH-22	05-12-98	66601	Soil (30-31.5)	BTEX/MTBE, TVPH. TEPH
TH-23	05-12-98	66607	Soil (Composite 5-36.5)	VOCs (8260)
TH-23	05-12-98	666087	Soil (Composite 5-36.5)	SVOCs (8270)
TH-23	05-12-98	66606	Soil (Composite 5-36.5)	Total RCRA-8 Metals

Location	Date of Sampling	Tag Number	Medium (Soil Sampling Interval in Feet)	Analysis
TH-23	05-12-98	66605	Soil (5-6.5)	BTEX/MTBE, TVPH. TEPH
TH-23	05-12-98	63609	Soil (30-31.5)	BTEX/MTBE, TVPH. TEPH
TH-24	05-13-98	55496	Soil (Composite 5-36.5)	Total RCRA-8 Metals
TH-24	05-13-98	55495	Soil (5-6.5)	BTEX/MTBE, TVPH. TEPH
TH-24	05-13-98	55497	Soil (25-31.5)	BTEX/MTBE, TVPH. TEPH
TH-24	05-13-98	55498	Soil (Composite 5-36.5)	SVOCs (8270)
TH-25	05-13-98	55499	Soil (5-6.5)	BTEX/MTBE, TVPH. TEPH
TH-25	05-13-98	55500	Soil (Composite 5-36.5)	Total RCRA-8 Metals
TH-25	05-13-98	55501	Soil (Composite 5-36.5)	SVOCs (8270)
TH-25	05-13-98	55502	Soil (25-31.5)	BTEX/MTBE, TVPH. TEPH
GP-1	06-01-98	55531	Soil (1.9-2.9)	Total RCRA-8 Metals
GP-1	06-01-98	55534	Soil (1.9-10.0)	Total RCRA-8 Metals
GP-1	06-01-98	55532	Soil (1.9-2.9)	BTEX/MTBE, TVPH. TEPH
GP-1	06-01-98	55533	Soil (1.9-10.0)	BTEX/MTBE, TVPH. TEPH
GP-2	06-01-98	55536	Soil (3-10)	Total RCRA-8 Metals
GP-2	06-01-98	55535	Soil (3-10)	BTEX/MTBE, TVPH. TEPH
GP-3	06-01-98	32953	Soil (4-10)	Total RCRA-8 Metals
GP-3	06-01-98	32954	Soil (4-10)	BTEX/MTBE, TVPH. TEPH
GP-4	06-01-98	32958	Soil (2.5-10)	Total RCRA-8 Metals
GP-4	06-01-98	32955	Soil (2.5-10)	VOCs (8260)
GP-4	06-01-98	32957	Soil (2.5-10)	BTEX/MTBE, TVPH. TEPH
GP-4	06-01-98	32956	Soil (2.5-10)	SVOCs (8270)

Water Samples				
TH-10	05-08-98	55494	H_2O	TEPH
TH-10	05-08-98	55492, 55493	H_2O	TVPH
TH-16	05-08-98	64499	H_2O	TEPH
TH-16	05-08-98	64496, 64497	H_2O	TVPH
TH-18	05-08-98	64502	H_2O	TEPH
TH-18	05-08-98	64500, 64501	H_2O	TVPH
TH-19	05-26-98	55518	H_2O	Total Dissolved RCRA-8 Metals
TH-19	05-26-98	55515, 55516	H_2O	8260, TVPH
TH-19	05-26-98	55517	H_2O	TEPH
TH-20	05-26-98	55511	H_2O	Total Dissolved RCRA-8 Metals
TH-20	05-26-98	55512, 55513	H_2O	8260, TVPH
TH-20	05-26-98	55514	H_2O	TEPH
TH-21	05-26-98	55526	H_2O	Total Dissolved RCRA-8 Metals
TH-21	05-26-98	55523, 55523	H_2O	8260, TVPH
TH-21	05-26-98	55525	H_2O	TEPH
TH-22	05-26-98	55522	H_2O	Total Dissolved RCRA-8 Metals
TH-22	05-26-98	55519, 55520	H_2O	8260, TVPH
TH-22	05-26-98	55521	H_2O	TEPH
TH-23	05-26-98	55510	H_2O	Total Dissolved RCRA-8 Metals
TH-23	05-26-98	55507, 55508	H_2O	8260, TVPH
TH-23	05-26-98	55509	H_2O	TEPH
TH-24	05-26-98	55503	H_2O	Total Dissolved RCRA-8 Metals
TH-24	05-26-98	55504, 55505	H_2O	8260, TVPH
TH-24	05-26-98	55506	H_2O	TEPH
TH-25	05-26-98	55527	H_2O	Total Dissolved RCRA-8 Metals
TH-25	05-26-98	55528, 55529	H_2O	8260, TVPH
TH-25	05-26-98	55530	H_2O	TEPH

Field Screening Measurements of Test Hole Samples			
Location	Depth (Feet)	PID Headspace (ppm)	Radiation
TH-19	5-6.5	0	0
	10-11.5	0	0
	15-16.5	0	0
	20-21.5	0	0
	25-26.5	0	0
	30-31.5	0	0
TH-20	5-6.5	0	0
	10-11.5	1.4	0
	15-16.5	23	0
	20-21.5	0	0
	25-26.5	6.5	0
	30-30.5	0	0
	35-36.5	5	0
TH-21	5-6.5	0	0
	10-11.5	0	0
	15-16.5	0	0
	20-21.5	0	0
	25-26.5	0	0
	30-31.5	0	0
	35-36.5	0	0
TH-22	5-6.5	No Recovery	No Recovery
	10-11.5	0	0
	15-16.5	0	0
	20-21.5	0	0
	25-26.5	0	0
	30-31.5	0	0
	35-36.5	0	0
TH-23	5-6.5	0	0
	10-11.5	0	0
	15-16.5	0	0
	20-21.5	0	0
	25-26.5	0	0
	30-31.5	0	0
	35-36.5	0	0

Location	Depth (Feet)	PID Headspace (ppm)	Radiation
TH-24	5-6.5	0	0
	10-11.5	0	0
	15-16.5	0	0
	20-21.5	0	0
	25-26.5	0	0
	30-31.5	0	0
	35-36.5	0	0
TH-25	5-6.5	2	0
	10-11.5	1	0
	15-16.5	0	0
	20-21.5	0	0
	25-25.7	0	0
	30-31.5	0	0
	35-36.5	0	0
GP-1	1.9-2.9	0	0
	2.9-5.7	0	0
	5.7-8.0	0	0
	8-10.0	0	0
GP-2	2-4	0	0
	4-6	0	0
	6-8	0	0
	8-10	0	0
GP-3	4-5	0	0
	5-6	0	0
	6-8	0	0
	8-10	0	0
GP-4	2.5-4.5	0	0
	4.5-6	0	0
	6-7.5	0	0
	7.5-10	0	0

APPENDIX 2.0

SURVEY MEASUREMENTS OF SOIL BORINGS

G 1015-3 4500 BRIGHTON BLVD. – CENTRAL STORAGE

Unit: fts
Coordinate type: Geodetic
Reference ellipsoid: WGS 1984
Projection set: CO CENTRAL 83

#211	39 46 49.641567 N 104 58 2.805282 W	5185.1137	TOP OF PVC
TH-24		5185.21	TOP OF CAP
#212	39 46 43.266594 N 104 58 6.645880 W	5187.6253	TOP OF PVC
TH-21		5187.71	TOP OF CAP
#215	39 46 46.238811 N 104 58 6.109126 W	5185.7083	TOP OF PVC
TH-23		5185.84	TOP OF CAP
#216	39 46 44.144478 N 104 58 5.970373 W	5187.5026	TOP OF PVC
TH- 22		5187.69	TOP OF CAP
#217	39 46 43.158158 N 104 58 4.340397 W	5187.4134	TOP OF PVC
TH-20		5187.62	TOP OF CAP
#218	39 46 44.486207 N 104 58 2.616380 W	5187.2741	TOP OF PVC
TH-19		5187.58	TOP OF CAP
#210	39 46 49.939371 N 104 58 0.580752 W	5184.9750	TOP OF PVC
TH-25		5185.14	TOP OF CAP
#219	39 46 42.218039 N 104 58 3.196606 W	5187.7931	TOP OF PVC
GP-1			
#220	39 46 43.080540 N 104 58 2.094170 W	5187.0803	TOP OF PVC
GP-2			
#221	39 46 43.945901 N 104 58 0.993025 W	5186.6399	TOP OF PVC
GP-3			
#214	39 46 47.040850 N 104 56 26.221440 W	5261.8333	TOP OF ROD
NGS STATION "B394" 1988			
#213	39 44.340993 N 104 58 53.465223 W	5146.3780	TOP OF ROD
NGS STATION "ARGO" 1995			

Drexel Barrell & Co.

Engineers/Surveyors

Boulder,
Colorado Springs,
Greeley

5401 West 10th Street
Suite 100A
Greeley, Colorado 80634

970 351 0645
970 351 0665 Fax

June 10,1997

Robert C. German, PG, CHMM
Walsh Environmental Scientists
4888 Pearl East Circle, Suite 108
Boulder, Colorado 80301-2475

Dear Mr. German :

I have enclosed the coordinate list for the monitoring wells and Geoprobe holes located at 4500 Brighton Blvd. – Central Storage facility.
All coordinates are based on the North American Datum of 1983 (1992 Adjustment). All elevations are based on the North American Vertical Datum of 1988.

It has been a pleasure to participate in this project and look forward to future projects with your firm.

Please call me if you should have any questions.

Sincerely
David B. Dusdal

David B. Dusdal, P.L.S.
Technical Services Manager

APPENDIX 3.0

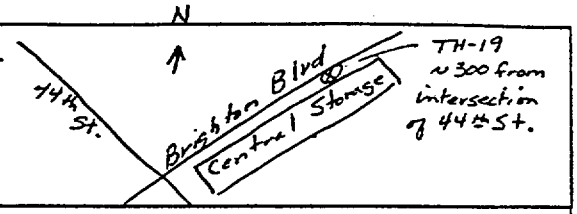
FIELD FORMS

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-19	1 of 1

Location Sketch or Description.



Project I-70 / Brighton Blvd. Location 4400 BRIGHTON BLVD

Elevation _____ Drilling Contractor Goodson & Assoc.

Drilling Method and Equipment CME 55 ; 7" HSA

Water Level and Date 29.65 5/26/98 Start 1135 5/11/98 Finish 1240 5/11/98 Logger DRW

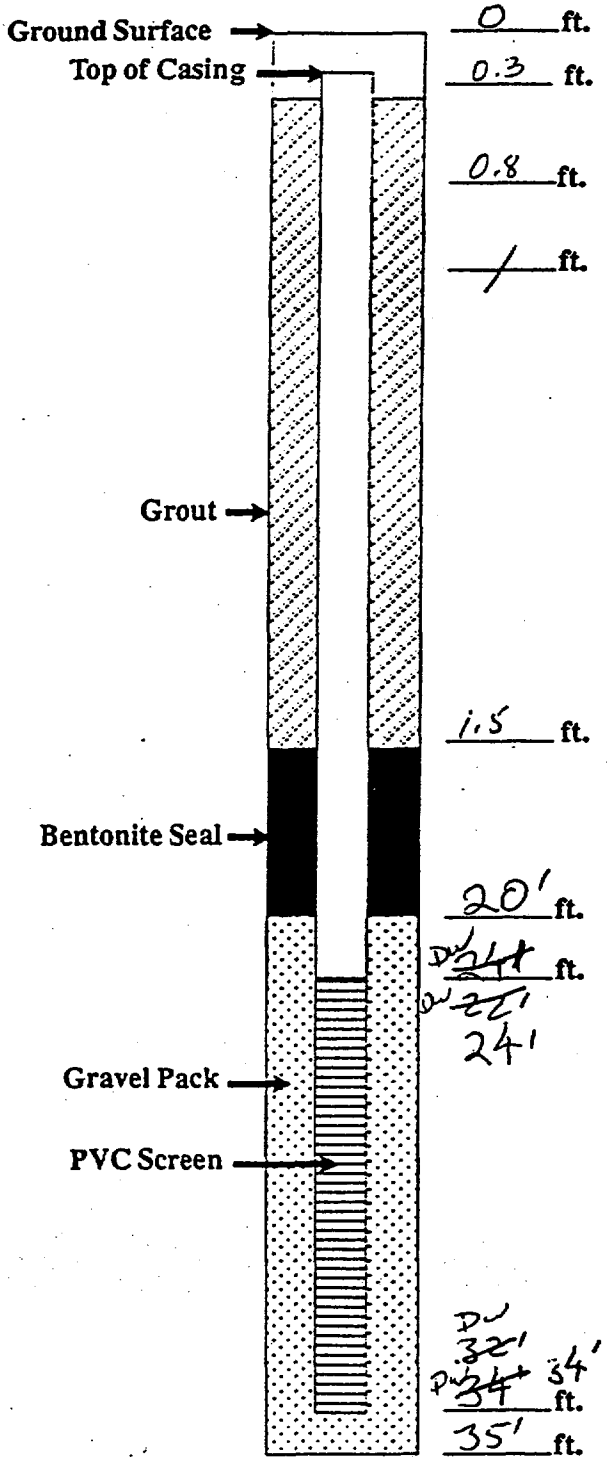
Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						0-0.5 Asphalt	Aspn.	
	5		66597	18/18	2-2-6	0.5-16.5 SP Sand, poorly graded, med-fine grained, <10% fines; 10YR 6/6 yellowish brown, moist, loose. dark stain 6.0-6.3 No odor, No PID Sand coarsens downward.	SP	0 5 Black Stn. 6-6.3 No odor
	10			18/18	7-6-7	16.5-18.0 CL clay; brown, moist, plastic		0 10
	15			18/18	4-4-12	18.0-35 SP sand, pink, coarse sand to gravel, <10% fines, loose, w/ pebbles to 1" diameter; moist flowing sands at 35'	CL	0 15
	20	NR		5/18	8-17-22			0 20
	25			18/18	10-14-30+	66597 5' BTEX/MTBE, TVPH, TEPH 66598 30' " " , " , " 66608 Composite 8270 66599 Composite 8260 66609 Composite Metals	SP	0 25
	30		66598		9-9-13	Black, dark stain 6.0-6.3 No staining, odors, below 6.3 No PID readings 0-T.D.		0 30
	35							35

SOILBORI.CDR RB 3/10/95

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 Well No. ~~MW-2~~ TH-19 RCG



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: 35'
Hole Diameter: 7"
Drilling Company: Goodson + Assoc.
Driller: Steve
Rig Type: CME-55
Bits: 7" HSA
Geologist: Dave Walker

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	5/11/98	1130	5/11/98	1240
Screen Placement:	___	1240	___	1245
Filter Placement:	___	1250	___	1255
Seal Placement:	___	1255	___	1305
Grouting:	5/12/98	1400	5/12/98	1430

Depth to Water

Depth: 29.65 Date: 5/26/98 Time: 1420

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	500#	300#
Type:	Quikcrete	Bentonite	10-20 sand

Screen			
Size:	10'	Config.:	.010 ~~020~~ slot
Area/Ft.	___	Comp.:	PVC
Inside Diam.:	2"	Outside Diam.:	___

Comments

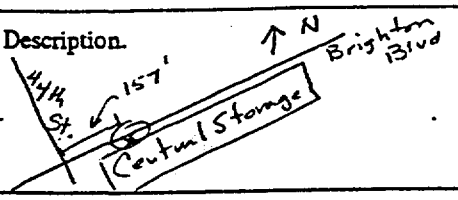
Running sands. Added 5 gal water
Measured 34.4' TD from TOC (34.1' below ground level)

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-20	1 of 1

Location Sketch or Description



Project I-70 / Brighton Blvd Location 4400 Brighton Blvd

Elevation ____ Drilling Contractor Goodson

Drilling Method and Equipment CME-55 7" HSA

Water Level and Date 29.81 5/26/98 Start 0915 05/11/98 Finish 1030 5/11/98 Logger DRW

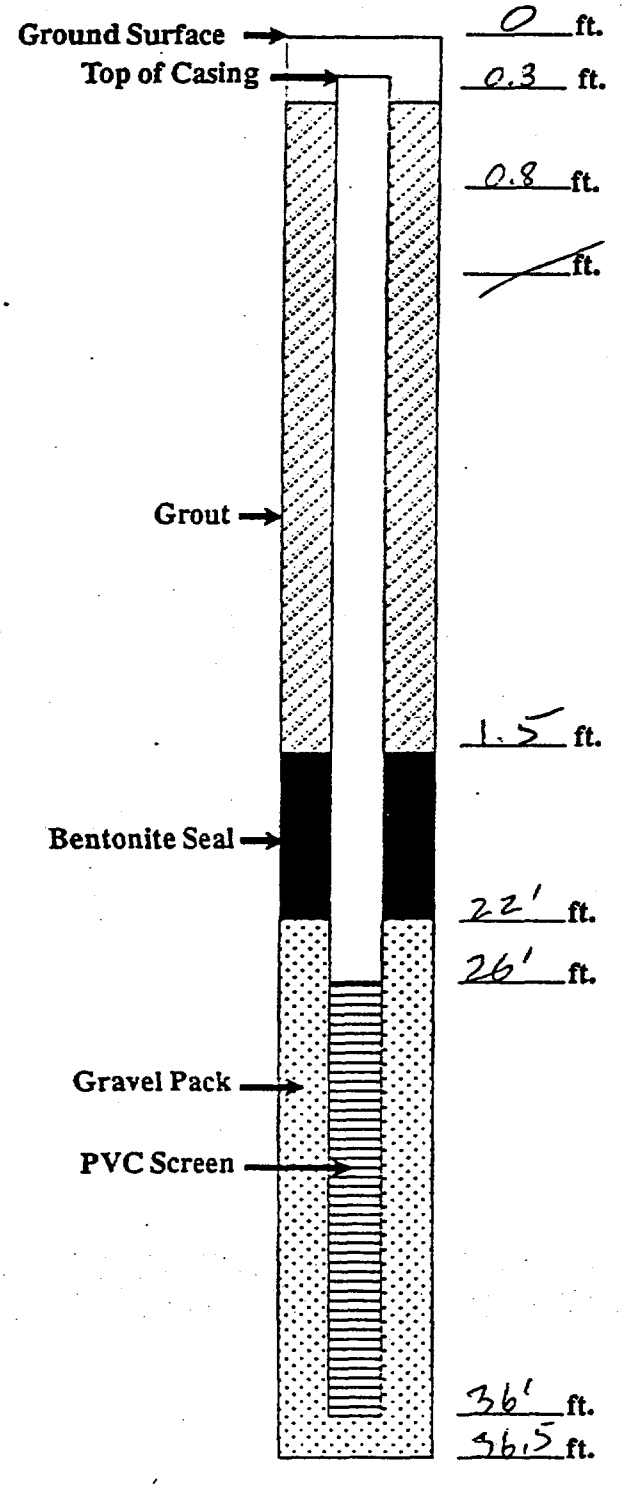
Elevation	Depth Below Surface	Sample: Interval	Sample: Tag No.	Sample: Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
	0					0-0.5 Asphalt	Asph.	
	5	⊠		18/18	2-1-2	0.5-15.5 SP Sand, poorly graded fine to coarse, <10% fines; yellowish brown 10 YR 6/6; moist loose; coarsens downward.		0 No stain No odor 5
						15.5-16.0 CL clay; 10 YR 4/6 - dark yellowish brown, wet, plastic sandy.	SP	
	10	⊠		18/18	17-26-18	16-36.5 SP as above, but coarser moist; pebbles to 1" diameter		1.4 No stn. No odor 10
						Black stain 35.0-36.0		
						GW ~ 29'		No stn
	15	⊠		18/18	6-6-22			23 No odor 15
							CL	wet @ 15 dry @ 20
	20	⊠ NR		9/18	15-15-16			0 No stn. No odor 20
							SP	
	25	⊠ NR		15/18	6-20-29	Metals composite 66595 SVOC (8270) " 66596 BTEX/MTBE/TVPH/TEPH @ 30 ft 66593 and 35 ft 66594		No stn 6.5 No odor 25
	30	⊠	66593	6/6	25 for 6"		▽	No stn. 0 No odor 30
	35	⊠	66594	18/18	17-18-22			Black stn Sli. HC odor 35 0 Black Staining 35.0-36.0

SOILBORI.CDR RB 3/10/95

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 Well No. MW-1 TH-20 RLG



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: sampled to: 36.5' drilled to 35.2±
Hole Diameter: 7"
Drilling Company: Goodson + Assoc.
Driller: Steve
Rig Type: CME-55
Bits: Auger
Geologist: Dave Walker

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	5/11/98	9:15	5/11/98	10:30
Screen Placement:	~~10/35~~ "	10:35	____	10:35
Filter Placement:	____ "	10:35	____	1045
Seal Placement:	"	1045	____	1100
Grouting:	5/12/98	13:30	5/12/98	14:00

Depth to Water

Depth: 29.81 Date: 5/26/98 Time: 1330

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	6.00#	275#
Type:	Quickcrete	Bentonite	10-20 sand

Size:	Screen 10 ft	Config.:	.010 ~~020~~ slot
Area/Ft.	____	Comp.:	PVC
Inside Diam.:	2"	Outside Diam.:	____

Comments

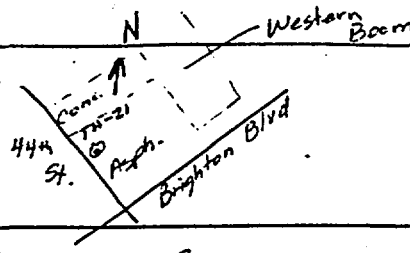
WELLLOGF.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-21	1 of 1

Location Sketch or Description



Project _____ Location Western Boom

Elevation _____ Drilling Contractor Geddson & Assoc.

Drilling Method and Equipment CME 55 7" HSA

Water Level and Date _____ Start 1400 5/11/98 Finish 1500 5/11/98 Logger DRW

Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						0-0.5 Asphalt	Asph	
	5	X	66612	18/18	2-2-3	0.5-13 SP Sand 10YR 6/6 yellowish brown, fine-med. grained, moist, loose, <10% fines, coarsens downward to coarse sand and gravel, pink	SP	No stn/No odor No PID 0 5
	10	X NR		14/18	9-16-13	13-17 SM sandy silt, lt brown 7.5YR 5/6, moist, plastic, loose w/20% coarse sand.		0 10
	15	X		18/18	5-7-5	17-36.5 SP sand, pink, coarse sand to gravel, <10% fines, damp	SM	0 15
						Water @ 28'		
	20	X NR		13/18	9-10-12	No staining, No odor, No PID 0-36.5'	SP	0 20
	25	X NR		13/18	8-19-25	66613 Composite Metals 66614 Composite 8270 66612 BTEX/MTBE, TVPH, TEPH		0 25
	30	X NR		14/18	10-21-25			0 30
	35	X NR		13/18	19-30/6			0 35

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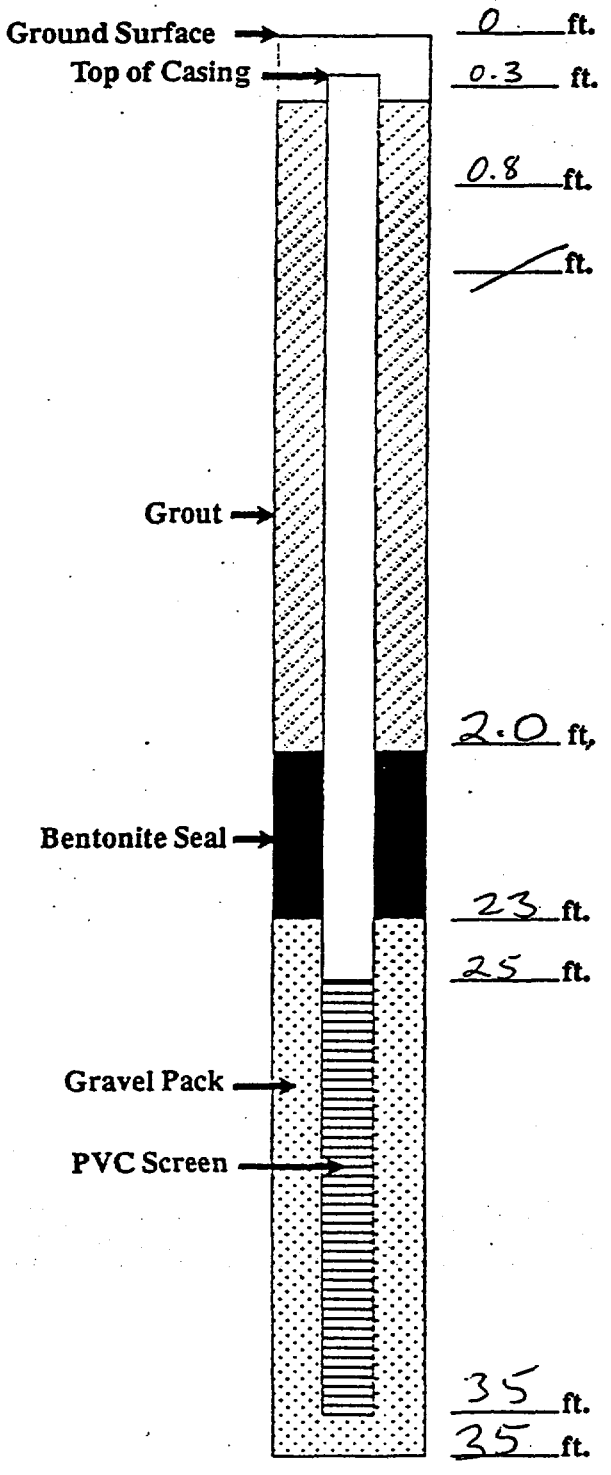
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 Well No. ~~MW-3~~ TH-21 RIG



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: 35'
Hole Diameter: 7"
Drilling Company: Goodson & Assoc
Driller: Steve
Rig Type: CME-55
Bits: 7" HSA
Geologist: Dave Walker

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	5/11/98	1400	5/11/98	1500
Screen Placement:	"	1500	"	1501
Filter Placement:	"	1501	"	1520
Seal Placement:	"	1520	"	1540
Grouting:	5/12/98	1430	5/12/98	1500

Depth to Water

Depth: 29' Date: 5/11/98 Time: 1540
30.162' 5/26/98 1645

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	500#	300#
Type:	Quikcrete	bentonite	10-20 sand

Screen			
Size:	10'	Config.:	.010 ~~020~~ slot
Area/Ft.		Comp.:	PVC
Inside Diam.:	2"	Outside Diam.:	

Comments

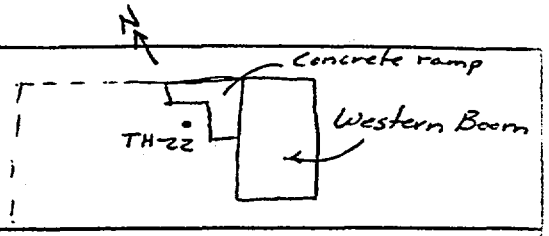
WELLLOGF.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-22	1 of 1

Location Sketch or Description.



Project I-70 / Brighton Blvd Location Western Boom

Elevation _____ Drilling Contractor Goodson & Assoc.

Drilling Method and Equipment CME 55 ; 7" HSA

Water Level and Date ~27' 5/12/98
30.18 5/26/98 1550

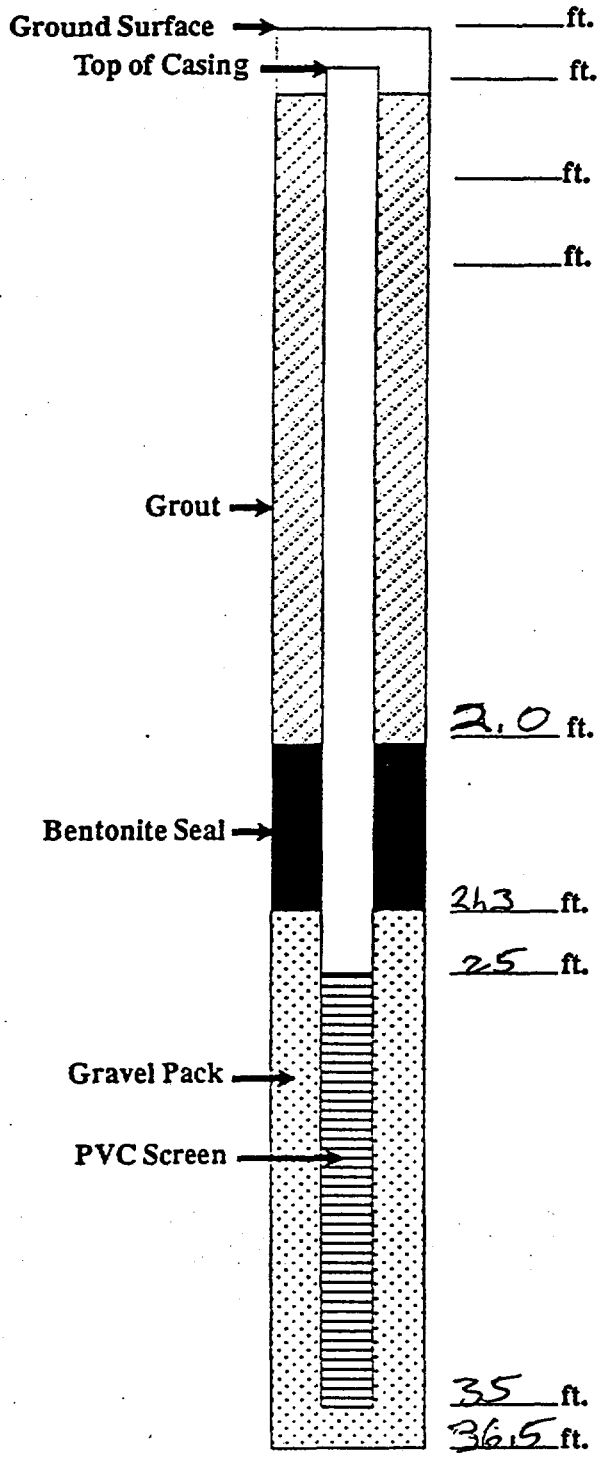
Start 0835 5/12/98 Finish 0945 05/12/98 Logger DRW

Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings	
						0-0.5 Concrete	CONCR.		
						0.5-6.5 brick fill	brick		
	5	NR		0/18	3-3-3	6.5-14 SP Sand coarse sand to gravel, pink, moist, <10% fines	fill	No Recovery	5
						14-16.5 SM sandy silt w/ 20% med-coarse sand, brown, moist, plastic			
	10		66600	18/18	5-28-23	16.5-36.5 SP gravel, coarse sand & gravel, <10% fines, moist, pink.	SP	0	10
	15			9/18	5-5-6	GW @ ~27'	SM	0	15
						Composite Samples 66602 - Metals 66603 - 8260 66604 - 8270			
	20			13/18	10-30-10/2		SP	0	20
						BTEX/MTBE, TVPH, TEPH 10-11.5 - 66600 30-31.5 - 66601			
	25			13/18	8-22-61/5			0	25
	30		66601	13/18	5-6-7	No stain, No odor, No PID 10-36.5' ▽		0	30
	35			18/18	10-11-12			0	35

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 Well No. MW-4 plus TH-22



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: 36.5' sampled to; 35± drilled to:
Hole Diameter: 7"
Drilling Company: Goodson & Assoc
Driller: Steve
Rig Type: CME-55
Bits: 7" HSA
Geologist: Dave Walker

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	5/12/98	0835	5/12/98	0945
Screen Placement:		0950		0950
Filter Placement:		0951		1020
Seal Placement:		1020		1045
Grouting:	5/12/98	1500	5/12/98	1530

Depth to Water

Depth: 30.18 Date: 5/26/98 Time: 1550

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	500#	350#
Type:	Quickcrete	Bentonite	10-20 Sand

Screen			
Size:	10'	Config.:	.010 slot
Area/Ft.		Comp.:	PVC
Inside Diam.:	2"	Outside Diam.:	

Comments

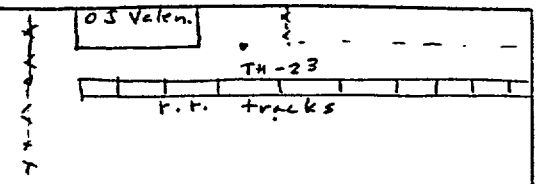
WELLLOGF.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-23	1 of 1

Location Sketch or Description.



Project I-70 / Brighton Blvd. Location OJ Valentine Lumber

Elevation _____ Drilling Contractor Goodam & Assoc.

Drilling Method and Equipment CME 55 ; 7" HSA

Water Level and Date 29' 5/12/98
29.23 5/26/98 1232

Start 1105 05/12/98 Finish 1155 05/12/98 Logger DRW

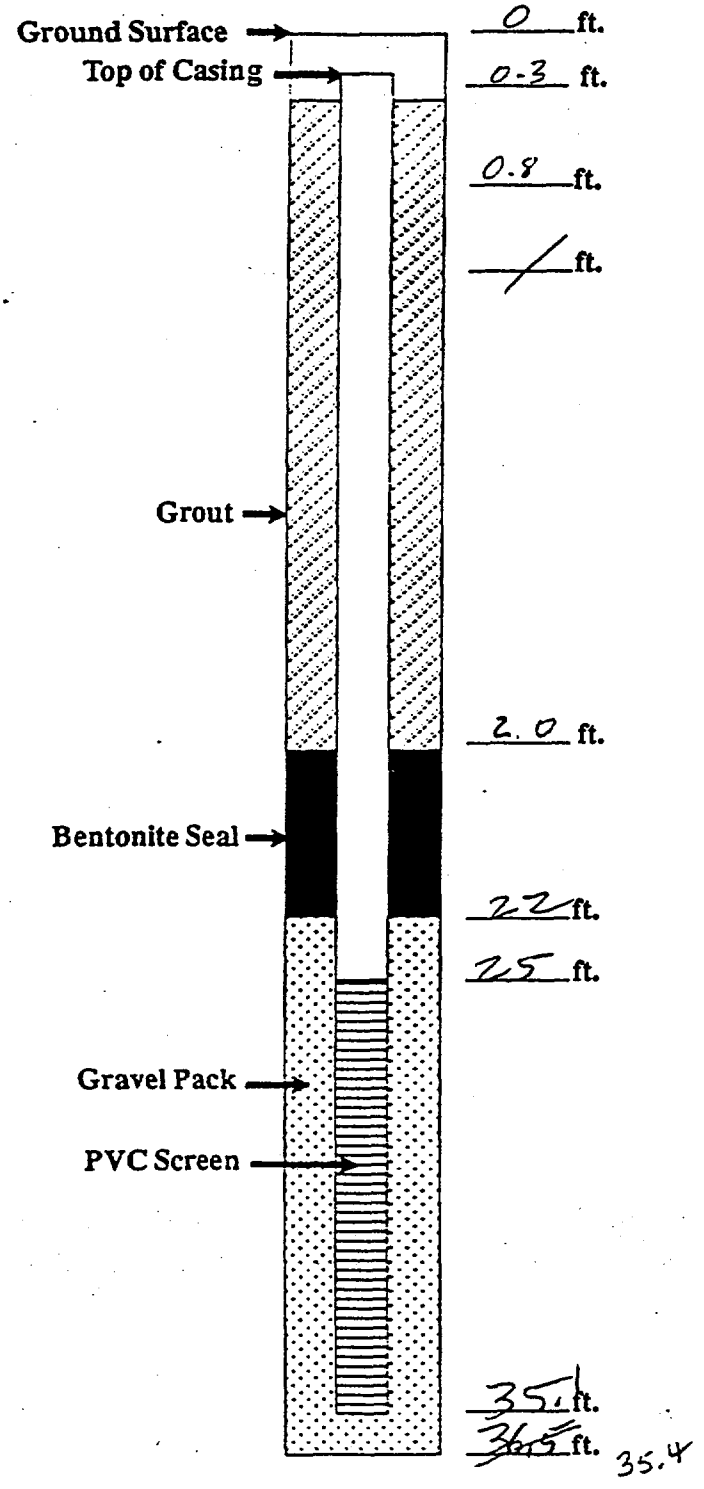
Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						0-0.5 Asphalt	Asphalt	
						0.5-8.0 SP sand, med-coarse grained, yellowish brown, moist, loose.	SP	
	5	X	66605	18/18	3-4-7	8.0-12.0 SM, sandy silt, brown, 30% fine sand, moist, soft, not plastic	SM	0 5
	10	X		18/18	6-6-5	12.0-36.5 SP gravel to 1"; coarse sand to gravel, <10% fines moist, pink	SP	0 10
	15	X		18/18	8-12-16	Water @ 29'		0 15
	20	X		18/18	7-14-14	Composite Samples 66607 - 8260 66608 - 8270 66606 - Metals 66605 - 5-6.5 } BTEX/MTBE, TVPH, TEPH 63609 - 30-31.5± }		0 20
	25	X		18/18	14-20-20	No Staining, No odor, No PID 5-36.5 ft.		0 25
	30	X	63609	17/17	25-25/5	TD = 35.4 ±		0 30
	35	X		18/18	10-11 2" CAVE			0 35

SOILBORI.CDR RB 3/10/95

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3306-020 Well No. ~~MW-5~~ RIG TH-23



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: 36.5' (sampled to:) 35± (drilled to:)
Hole Diameter: 7"
Drilling Company: Goodson + Assoc
Driller: Steve
Rig Type: CME-55
Bits: 7" HSA
Geologist: Dave Walsh

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	~~5/12/98~~	1105	~~5/12/98~~	1155
Screen Placement:		1155		1155
Filter Placement:		1155		1215
Seal Placement:		1205		1220
Grouting:		1220		1300

Depth to Water

Depth: 29.23 Date: 05/26/98 Time: 1217

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	500#	350#
Type:	Quickcrete	Bentonite	10-20 Sand

Screen			
Size:	10'	Config.:	.010 ~~.020~~ Slot
Area/Ft.		Comp.:	PVC
Inside Diam.:	2"	Outside Diam.:	

Comments

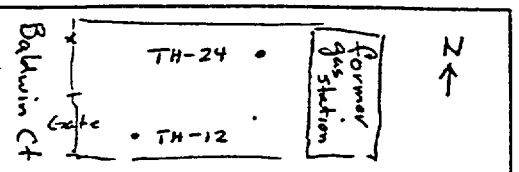
WELLLOGF.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-24	1 of 1

Location Sketch or Description.



Project I-70 Brighton Blvd. Location 4614 Baldwin Ct.

Elevation _____ Drilling Contractor Goodson & Assoc.

Drilling Method and Equipment CME 55 7" HSA

Water Level and Date 29.42 TOC 5/26/98 Start 0900 5/13/98 Finish 1020 5/13/98 Logger RLG

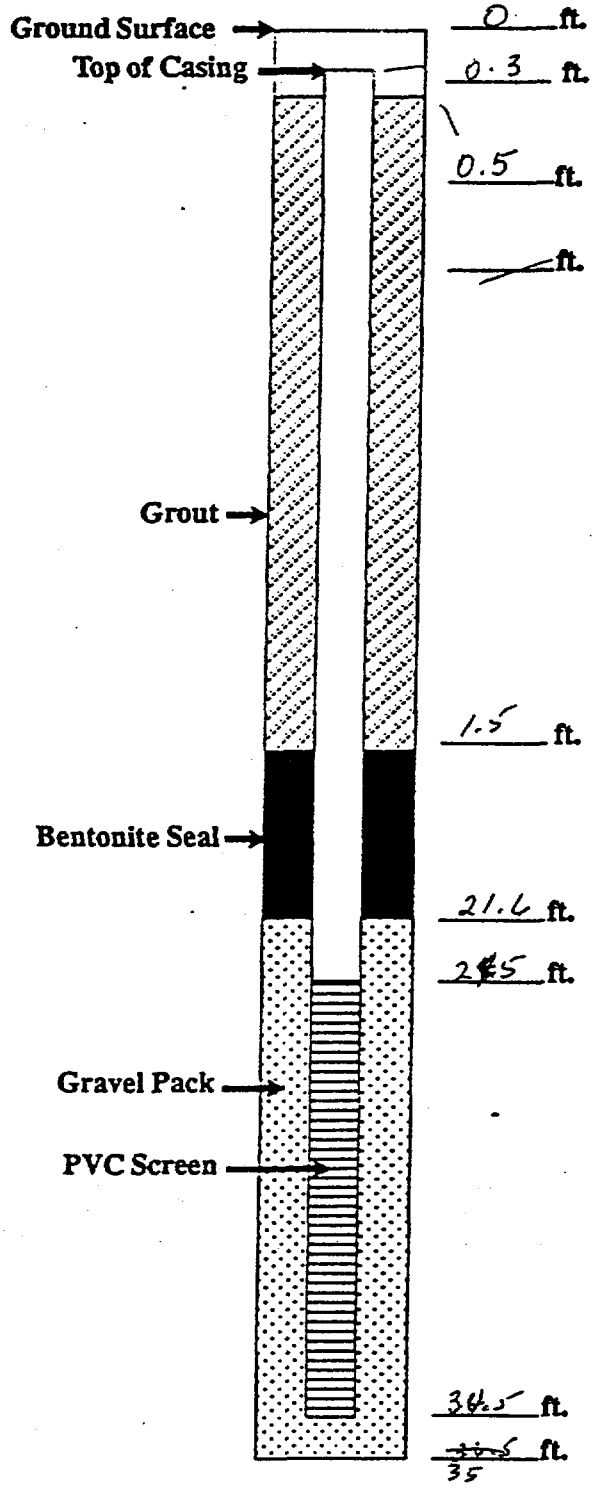
Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						0-0.3 Asphalt	Asph.	
	5	X	55495	18/18	4-6-6	0.3-7 fill, dark brn - blk C. sd, brick frags, coal dust, becoming fine sdy @ 6'; some questionable black stn 5-6.5 No odor No PID	fill	Questionable black stn. 5-6.5 0 5 No odor No PID
						Loose f. sand @ 8.5		
						10-10.2 SP C VPS sand, possible stn?? No odor, No PID	SP	Poss. stn. 10-10.2
	10	X		18/18	4-5-7	10.2-10.6 SP Vf pebbly VC sd, loose, dry NO/NS		0 10 No odor
						10.6-11.0 ML clay Vf sd w/ tr VC sd, tr. caliche blebs; NO/NS 7.5 YR 4/4 brn	ML	
						11.0-11.5 SP pebbly sand, loose, brn,	SP	
	15	X		18/18	4-9-10	15-15.5 ML brn, a.a. Vf sdy silt tr wh. caliche NO/NS	ML	0 15
						15.5-16.5 SP VPS Vf-C sd w/ tr pebbles clayey 15.5-16.0; v. loose @ 16 5 YR 5/4 reddish brn; contact sharp w/ overlying ML		
	20	X		18/18	6-10-10	20-21.5 SP pink Vf-VC sd w/ Vf pebbles; loose; NO/NS		0 20
						25-26 SP; C-VC sd, pebbly loose sand, dry-sli moist; NO/NS pebbles well rnd-vwrd.	SP	
	25	X NR		12/18	10/30/34	30-31.5 GW Core dripping; w/ some Vf sd; loose; tr hd clay lag (½" thick @ 30.5'); some fg. pebbles. NO/NS		0 25
			55497			35-36.5 SP a.a.; VC sd w/ granules; 5% Vf pebbles (v.w.rd); tr fines; wet NO/NS		
	30	X		18/18	10-16-24		GW	0 30
						No odor No rads 0-36.5 Poss. staining in fill and to 10.2	SP	
	35	X		18/18	8-9-12	55496 Composite 5-36.5 Metals 55495 5-6.5 BTEX/MTBE TVPH TEPH 55497 25-31.5 " " " 55498 Composite 5-36.5 8270		0 35

SOILBORLCDR RB 3/10/95

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 **Well No.** TH-24
Baldwin Ct



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: ~~36.5~~ sampled to: 35' drilled to:
Hole Diameter: 8"
Drilling Company: Goodson & Assoc.
Driller: Steve
Rig Type: CME 55
Bits: 7" HSA
Geologist: R. C. German

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	~~5~~/13	0900	5/13	1020
Screen Placement:	5/13	1020	5/13	1028
Filter Placement:	5/13	1020	5/13	1032
Seal Placement:	5/13	1032	5/13	1045
Grouting:	5/13	1050	5/13	1110

Depth to Water

Depth: 29.42 Date: 05/26/98 Time: 0945

Well Construction Materials

	Grout	Seals	Filter
Quantity:		1-50#	5-50# bags
Type:	Quikcrete	bentonite chips	10/20 CSSI

Screen

Size: 2" 10' 0.10 Config.: factory slotted
Area/Ft. 2-5', 10' total Comp.: PVC
Inside Diam.: 2" Outside Diam.: 2 1/4

Comments

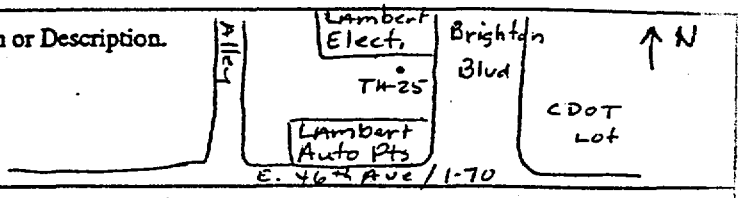
WELLLOGF.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	TH-25	1 of 1

Location Sketch or Description.



Project I-70 & Brighton Blvd. Location Lambert Auto Electric

Elevation _____ Drilling Contractor Goodson & Assoc.

Drilling Method and Equipment CME 55; 7" HSA

Water Level and Date 28.96 5/22/98 1145 Start 1150 5/13/98 Finish 1300 5/13/98 Logger RCG

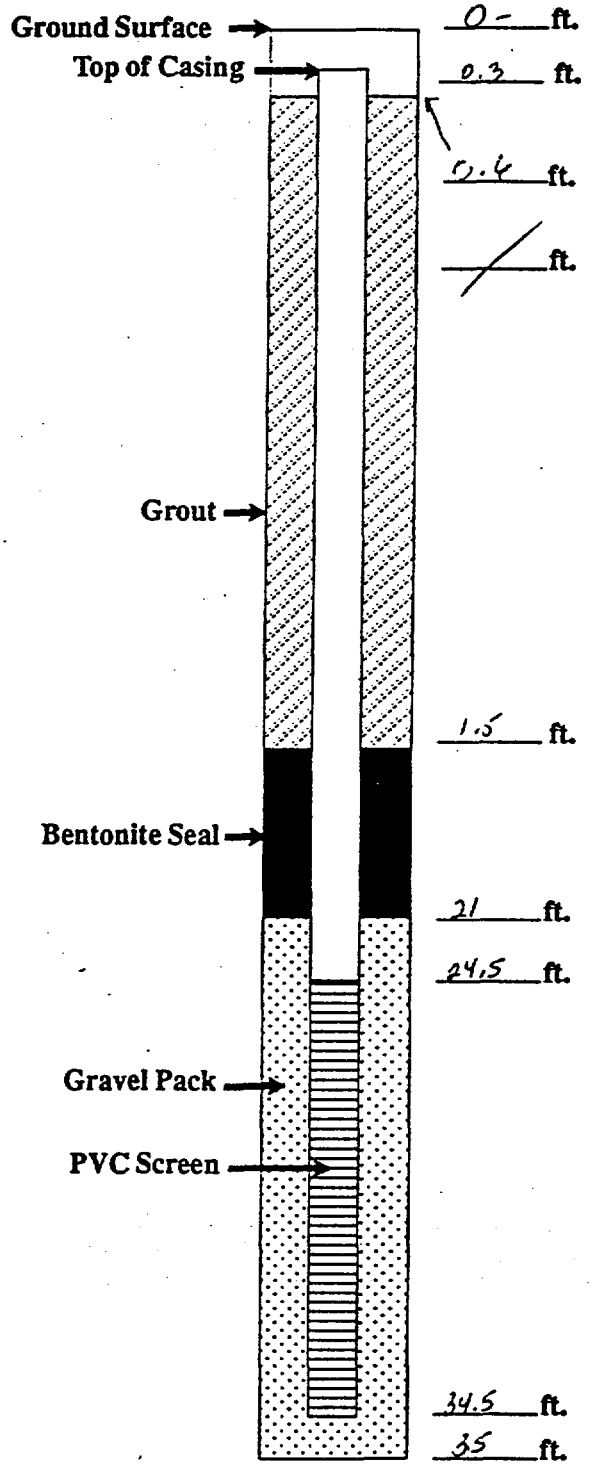
Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
	0					0 - 0.3 Asphalt	Asph	
						3-5 fill; red-brn c-vf sand w/ some small pebbles, brick frags.	fill	No odors, No staining
						5-5.1 red brn - brn cly vf sd		
						5.1-6.0 loose gravel and vf sd w/ tr. asphalt (?) - fill? No odor	SC	2
	5	NR	55499	12/18	3-4-4	No stain No rads		5
						10-11.5 coarse gravel to 11.0 GW	GW	
						11.0-11.5 sli. moist, sli plastic silty vf sdy clay ML NO/NS/NR		
	10			18/18	5-5-7	15-15.2 clay & clayey sd (slough?)		1
						15.2-16.5 GW v.c. sd and fine pebbles (m-wl rnd)	ML	
						20-21.5 coarse gravel a.a. red brn to pink NO/NS/NR		
	15			14/18	16-21-30	25-25.7 Coarse gravel a.a. w/ lg. rnd granite & quartz pebbles, sli. moist NO/NS/NR pounding on cobble/pebble	GW	0
	20			14/18	10-18-20	30-31.5 coarse gravel a.a. 1 pebble measured 3"x1" - rounded granite/qtz; wet; NO/NS/NR No odor in water		0
	25			8/8	57 for 8"	35-36.5 c. gravel a.a.		0
			55502			55499 5-6.5 BTEX/MTBE, TVPH, TEPH		▼
	30	NR		10/18	12-17-15	55500 Comp. 5-36.5 Metals		0
						55501 Comp 5-36.5 8270		
						55502 25-31.5 BTEX/MTBE, TVPH, TEPH		
	35			18/18	1-3-4	No odors, No staining, No rads above background surface to T.D.		0

SOILBORLCDR RB 3/10/95

Walsh
Environmental Scientists and Engineers, Inc.

WELL CONSTRUCTION LOG

Job No. 3008-020 **Well No.** TH-25



Measuring point is top of CASING unless otherwise noted

Drilling Summary

Total Depth of Hole: sampled to 36.5'; drilled to 35'
Hole Diameter: 8"
Drilling Company: Goodson & Assoc.
Driller: Goodson & Assoc. Steve
Rig Type: CME 55
Bits: 7" HSA
Geologist: R. C. GERMAN

Construction Time Log

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	5/13/98	1145	5/13/98	1310
Screen Placement:		1300		1310
Filter Placement:		1310		1315
Seal Placement:		1315		1325
Grouting:		1325		1355

Depth to Water

Depth: 28.96 Date: 5/26/98 Time: 1145

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1-50# bag	10-50# bags	4-50#
Type:	Quikcrete	bent. chips	10/20 CSSI

Screen

Size: 0.010 Config.: factory slotted
Area/Ft. 2-5'; 10' total Comp.: PVC
Inside Diam.: 2" Outside Diam.: 2 3/8

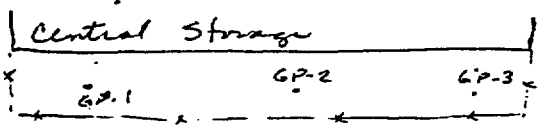
Comments

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
	GP-1	1 of 1

Location Sketch or Description.



Project I-70/Brighton Blvd Location 4400-4500 BRIGHTON BLVD

Elevation _____ Drilling Contractor Walsh

Drilling Method and Equipment Geoprobe

Water Level and Date NA Start 0950 06/01/98 Finish 1030 06/01/98 Logger RLG

Elevation	Depth Below Surface	Sample: Interval	Sample: Tag No.	Sample: Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
	0					0-0.9" (0.6) Concrete	Conc	
						0.9-1.9 fill (Concrete rubble sand) Fill	fill	black
						1.9-2.9 fill (black, moist, low	fill	0
				100%		asph., brick, c/sd, cody?		
	5					2.9-4.9 ML ply clayey silt	ML	0
						med. yellow brn.; moist, plastic	SC	5
				100%		No odor NS	SW	0
						4.7-4.9 SC med yell. brn,		0
	10					splotched w/ lt gray, red-orange		10
						NO/NS f-m, v. clayey SD; sli		
						moist, sli. plastic		
						4.9-5.3 SC a.a.		
						5.3-8.0 SW, red yell, pink - alt. bands		
						8.0-10.00' SW c-v.c. sand, 5-10%		
						vf gravel, s.ang., moist, loose		
						NO/NS		
						TD = 10'		
						fill 1.9-2.9 looked like asph.		
						and coal dust, not smelter		
						waste. fill had no odor, No PID		
						No rads		
						55531 (1.9-2.9') 1015 metals		
						55534 (1.9-10.0) 1040 "		
						55532 (1.9-2.9) 1015 BTEX/TVH/TEH		
						55533 (1.9-10.0) 1040 " " "		

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	GP-2	1 of 1

Location Sketch or Description.

Central Storage

fence → GP-1 GP-2 GP-3 ↗ N

Project: I-70 Brighton Blvd   Location: 4400-4500 Brighton Blvd
Elevation: ______   Drilling Contractor: Walsh
Drilling Method and Equipment: Geoprobe
Water Level and Date: NA   Start: 1100 06/01/98   Finish: 1140 06/01/98   Logger: KLG

Elevation	Depth Below Surface	Sample: Interval	Sample: Tag No.	Sample: Recovery	Standard Penetration Test Results 6"-6"-6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						Concrete 0-0.5	Concrete	
						Fill to 2.0 + concrete rubble, lg pebbles, m. sand	fill	
		X		100%		2.0-2.8 ML f sdy clayey silt moist, plastic dark brn	ML	0
	5	X				2.8-6.0 SC clayey vf sd-silt becoming drier and coarser	SC	0 / 5
		X		100%		@ 6.0 lt gray, lt brn, red brn. splotchy	SW	0
	10					NO/NS 2-6'		0 / 10
						6-10 SW vf - v.c. red. org. sand; subang., moist, NO/NS - loose		
						6-10 finer sd layers ~ 7, 8' ~ 0.1' thick.		
						No rods		
						55536 1156 3-10' Metals		
						55535 1156 3-10' BTEX/TVH/TEH		

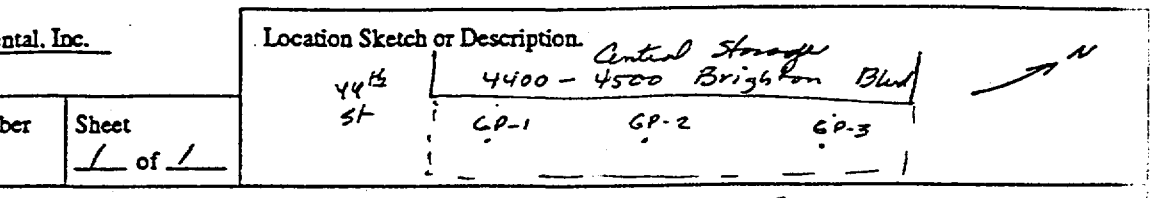
SOILBORLCDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	GP-3	1 of 1

Location Sketch or Description.



Project I-70 Brighton Blvd Location 4400-4500 Brighton Blvd

Elevation _____ Drilling Contractor Walsh

Drilling Method and Equipment Geoprobe 1½" I.D. 4-ft long SS Sampler

Water Level and Date _____ Start 1210 06/01/98 Finish _____ Logger RLB

Elevation	Depth Below Surface	Sample Interval	Sample Tag No.	Sample Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						0-0.4 Concrete	Concrete	
						0.4 – ~4.0 Fill; lg cobbles, concrete rubble; grey-brn sand, pebbles, & brick	fill	
	5			100%		ML 4-6.0 – Gdy, v.clayey silt, moist, plastic, lt yel.-brn – yell.-brn	ML	0 5
				100%		SW @ 6.0	SW	0
	10					SW @ 6.0 becoming v.c. sd. and fine gravel from ~6.5 – 10.0 GW	GW	0 10
						(No odor or staining, No PID 0-10'		
						GW pink, lt yell.-brn, org.-brn; pebb. rd – sub rd, granite, qtz; pebb. to 1" dia.; <5% fines; loose and moist; fine grained layers every 1 ft or so, each about ½" thick.		
						32953 1251 4-10' Metals		
						32954 1251 " BTEX, TVH, TEH		
						No risk		

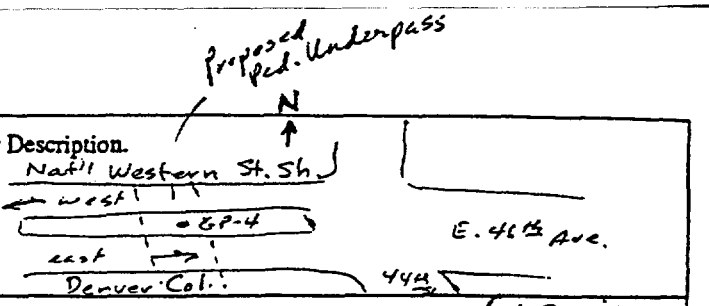
SOILBORI.CDR RB 3/10/95

Walsh Environmental, Inc.

SOIL BORING LOG

Project Number	Boring Number	Sheet
3008-020	GP-4	1 of 1

Location Sketch or Description.



Project I-70 ; Brighton Blvd Location ~4601 E. 46th Avenue (± @ exit ; Pedestrian Underpass)

Elevation _____ Drilling Contractor Walsh

Drilling Method and Equipment Geoprobe

Water Level and Date NA Start 1315 06/01/98 Finish 1350 06/01/98 Logger RLB

Elevation	Depth Below Surface	Sample: Interval	Sample: Tag No.	Sample: Recovery	Standard Penetration Test Results 6" - 6" - 6" (N)	Soil Description: USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy.	Symbol of USCS Log	Comments: PID readings/stainings
						Asphalt 0-0.2	~~Asph~~	
						0.2-1.5 fill c. grav, asph. frag, clay and silt having difficulty getting the sampling barrel through the fill.	fill	0
	5			100%		fill to 4.5 dk gray, dk brn asph., coal dust, some conc. and brick fragment; common rd. pebbles to 3/8" dia.; clayey, vf-vc sd.	GW	0 5
				100%			SW	0
	10					4.5-6.0 GW lt. yell. brn vf-vc sd and fine gravel; pebbles to 1"; subang-subrd. loose; No odor No stain	SP	0 10
						6.0-10		
						6.0-7.5 GW a.a.		
						7.5-10 SW; SP SW f-vc sd, w/ tr. gravel		
						7.5-9.0		
						9.0-10 SP mainly f-m sd w/ <5% fines		
						sand loose, moist No odor No stain No PID		
						0-10'		
						32958 1354 (2.5-10.0) Metals		
						32955 1354 " 8260		
						32957 1354 " BTEX/TEH/TVH		
						32956 1354 " 8270		
						No rads		

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-10	Project Number	3008-020
Casing Diameter	2"	Project Name	I-70
Personnel	RLG	Date	5/8/98
Tag Number		Time	1330

Casing Stickup	Sampling kit Hydac 3 Solinst 5 MMC ____	pH 7.00 Actual Adjust Temp Time 7.0 6.99 67.0 1015 ____ ____ ____ ____ ____ ____ ____ ____
Static Water Level (from stickup) (ft) 28.23	Conductivity Time Std = 1005 1017 Actual = 1005 @ 59.4°F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 67.4 1017 ____ ____ ____ ____ ____ ____ ____ ____
Total Well Depth (from stickup) (ft) 38.70	Clear Bailer Result no free product	Purging Equipment Stainless steel bailer
Saturated Thickness 10.47'	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 1.8 gal.	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1339	0	—	62.0	1124	7.[illegible]	clear on top; black silt; HC odor
1350	1	2	59.8	1068	7.09	spotty sheen lt. brn, cloudy; slt HC odor. No sheen
1358	2	4	59.2	1079	7.05	a.a.
1405	3	6	58.8	1077	7.03	a.a.
	Sample					

Remarks: _____

Collected by: _____

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	THE	TVH	OTHER
		1410 55494	1419 55492	

55493

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-16	Project Number	3008-020
Casing Diameter	2"	Project Name	I-70
Personnel	RG	Date	5-8-98
Tag Number		Time	1007

Casing Stickup	Sampling kit Hydac ____ Solinst ____ MMC ____	pH 7.00 Actual Adjust Temp Time 7.0 6.99 67 1015 ____ ____ ____ ____ ____ ____ ____ ____
Static Water Level (from stickup) (ft) 29.785	Conductivity Time Std = 1005 1017 Actual = 1005 @ 59.4 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 67.4 1017 ____ ____ ____ ____ ____ ____ ____ ____
Total Well Depth (from stickup) (ft) 38.90	Clear Bailer Result no free product	Purging Equipment S.S. bailer
Saturated Thickness 9.115	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 1.54 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1022	0	—	64.1	645	7.45	black - brown cloudy, silty
1030	1	2	61.6	1045	7.29	brn - silty
1035	2	4	61.0	1061	7.19	a.a.
1040	3	6	60.2	1111	7.21	a.a.
	Sample					

Remarks: _____

Collected by: RG

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	THE 64499	TVH	OTHER
		64496 1055	64496 64497	—

1050

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-18	Project Number	3008-020
Casing Diameter	2"	Project Name	I-70
Personnel	RLG	Date	5/8/98
Tag Number		Time	1134

Casing Stickup	Sampling kit Hydac ____ Solinst ____ MMC ____	pH 7.00 Actual Adjust Temp Time 7.0 6.99 67.0 1015 ____ ____ ____ ____ ____ ____ ____ ____
Static Water Level (from stickup) (ft) 29.10	Conductivity Time Std = 1005 1017 Actual = 1005 @ 59.4 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 67.4 1017 ____ ____ ____ ____ ____ ____ ____ ____
Total Well Depth (from stickup) (ft) 39.68	Clear Bailer Result no free product	Purging Equipment S.S. bailer
Saturated Thickness 10.58 ft	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 1.80 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1141	0	—	69.2	697	7.36	Clear - lt brn cloudy - No odor
1145	1	2	64.3	1101	7.05	q.a. Cloudy, red. brn
1155	2	4	66.0	1122	7.26	q.a.
1202	3+	6	61.7	1207	7.13	q.a.
	Sample					

Remarks: _____

Collected by: RLG

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	THE	TVH	OTHER
		64502 1205	64500 64501	

1208

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-19	Project Number	3008-020
Casing Diameter	2" 10	Project Name	I-70/ Brighton Blvd
Personnel	RLG	Date	05/26/98
Tag Number		Time	1420

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0958
Static water Level (from stickup) (ft) 29.65	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 34.4	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 4.75	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 0.81 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1430	—	—	63.5	1100	7.46	cloudy, lt brn no odor, no sheen
1435	1+	1	61.8	1094	7.11	brn, cloudy - silty
1441	2+	2	61.1	1087	7.12	a.a.
1446	3+	3	61.0	1083	7.08	a.a.
	Sample					

Remarks: _____

Collected by: RLG

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				5551.0 1508 Metals

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-20	Project Number	3008-020
Casing Diameter	2" ID	Project Name	I-70/Brighton Blvd
Personnel	RLG	Date	05/26/98
Tag Number		Time	1330

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0956
Static water Level (from stickup) (ft) 29.81	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 35.15 ~~29.81~~ Tag	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 5.34	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 0.91 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1334	—	0	66.1	1025	7.58	Clear - lt brn cldy No odor, No sheen
1337	1	1	63.1	1055	7.15	cldy brn
1343	2	2	62.2	1047	7.11	a.a.
1348	3	3	61.7	1073	7.10	a.a.
	Sample					

Remarks: _____

Collected by: RLG

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				5511 1407 Metals

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-21	Project Number	3008-020
Casing Diameter	2" 10	Project Name	I-70/ Brighton Blvd
Personnel	RCG	Date	05/26/98
Tag Number		Time	1645

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 ~~70.9~~ 0958 69.9 RG
Static water Level (from stickup) (ft) 30.162	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 35.0	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 4.84	Sample Depth (ft)	Sampling Equipment disposal bailer
Casing Volume 0.82 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1654	—	—	64.3	1031	7.45	clear - cloudy - lt brn @ base No odor, No sheen
1700	1 +	1	64.4	1049	7.18	brn silty
1706	2 +	2	64.4	1076	7.15	a.a.
1710	3 +	3	64.3	1078	7.15	a.a.
	Sample					

Remarks: _____

Collected by: _____

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				55526 Mcfab 1733

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-22	Project Number	3008-020
Casing Diameter	2" ID	Project Name	I-70/ Brighton Blvd
Personnel	RLG	Date	05/26/98
Tag Number		Time	1550

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0958
Static water Level (from stickup) (ft) 30.184	Conductivity Time Std = 1005 0954 Actual= 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 35.1	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 4.92	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 0.84 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1600	—	—	65.4	1102	7.22	clear, slightly cldy - lt brn
1607	1+	1	61.7	1068	7.07	brn cloudy - silty No odor, No sheen
1612	2+	2	61.0	1138	7.10	a.a.
1617	3+	3	61.7	1145	7.09	a.a.
	Sample					

Remarks:

Collected by: RLG

Checked by:

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				55522 Metals 1636

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-23	Project Number	3008-020
Casing Diameter	2" ID	Project Name	I-70/ Brighton Blvd
Personnel	RCG	Date	05/26/98
Tag Number		Time	1232

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0958
Static water Level (from stickup) (ft) 29.23	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 35.1	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 5.87	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 1.0	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1239	—	—	70.3	1130	7.60	Clear - slight brn cldy - No odor, No sheen
1245	1	1	64.5	1118	7.27	brn cldy - No odor etc
1248	2	2	64.7	1091	7.20	a.a.
1255	3	3	66.2	1075	7.17	a.a
	Sample					

Remarks: _____

Collected by: RCG

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				55510 1314 Metals

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-24	Project Number	3008-020
Casing Diameter	2" ID	Project Name	I-70/ Brighton
Personnel	RCG	Date	05/26/98
Tag Number		Time	0951

Casing Stickup	Sampling kit Hydac #3 Solinst #1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0958
Static water Level (from stickup) (ft) 29.42	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.20 70.4 1000
Total Well Depth (from stickup) (ft) 34.60	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 5.18'	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 0.9 gal.	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1000	—	—	65.1	1184	7.62	clear - lt brown NO odor or sheen
1046	1	1	67.1	1242	7.23	brn, silty, muddy
1052	2	2	68.0	1197	7.18	a.a.
1100	3	3	67.3	1178	7.36	a.a.
	Sample					

Remarks: _____

Collected by: _____

Checked by: _____

Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				55053 1L

GROUND-WATER SAMPLING FIELD DATA SHEET

Well Number	TH-25	Project Number	3008-020
Casing Diameter	2" ID	Project Name	I-70/Brighton Blvd
Personnel	RLG	Date	05/26/98
Tag Number		Time	1740

Casing Stickup	Sampling kit Hydac 3 Solinst 1 MMC	pH 7.00 Actual Adjust Temp Time 7.0 7.00 69.9 0958
Static water Level (from stickup) (ft) 28.96	Conductivity Time Std = 1005 0954 Actual = 1003 @ 67.7 °F	pH 10.00 Actual Adjust Temp Time 10.0 10.00 70.4 1000
Total Well Depth (from stickup) (ft) 35.6	Clear Bailer Result no free product	Purging Equipment disposable bailer
Saturated Thickness 6.64	Sample Depth (ft)	Sampling Equipment disposable bailer
Casing Volume 1.13 gal	REMEMBER: 2" well multiply by .17 4" well multiply by .66	

Time	Casing Volumes	Gallons Removed	Temperature °F	Conductivity uS/cm	pH	Comments
1754	—	—	65.4	1265	7.22	clear - cloudy brn muddy @ bottom
1759	1.2 RLG 1		62.9	1346	7.12	No odor, No sheen brn, silty
1805	2.4 RLG 2		62.9	1348	7.13	a.a.
1810	4.6 RLG 3		61.7	1363	7.13	a.a.
	Sample					

Remarks: _____

Collected by: RLG

Checked by: _____

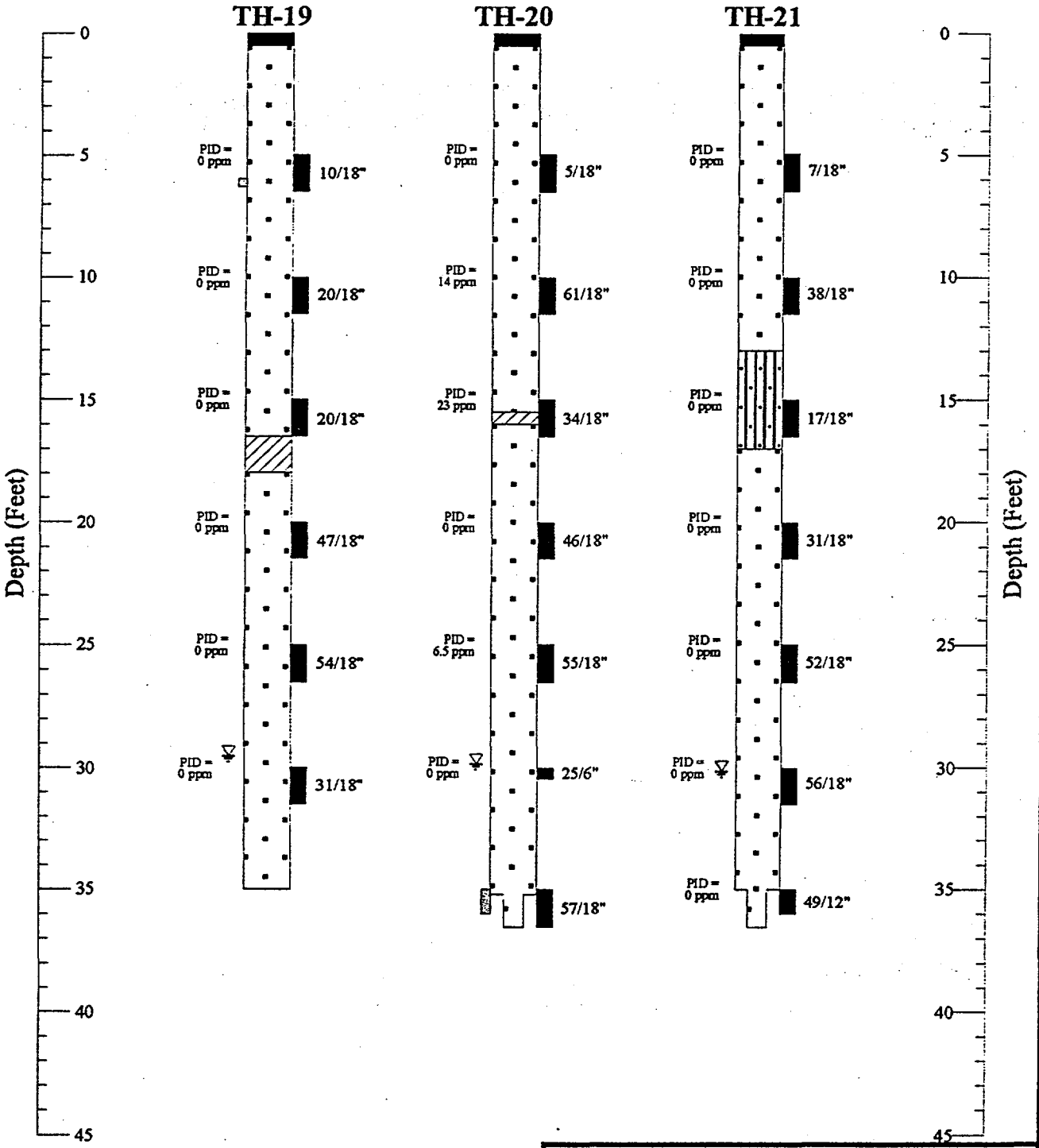
Sampled for:

BTEX/TVH/TEH	BTEX	TEH	TVH	OTHER
				1,2 DCA 55527 Metals

APPENDIX 4.0

GRAPHIC LOGS

SOIL BORING LOGS
I-70 & Brighton Boulevard
4400 Brighton Blvd. (TH-19, 20); Western Boom (TH-21)



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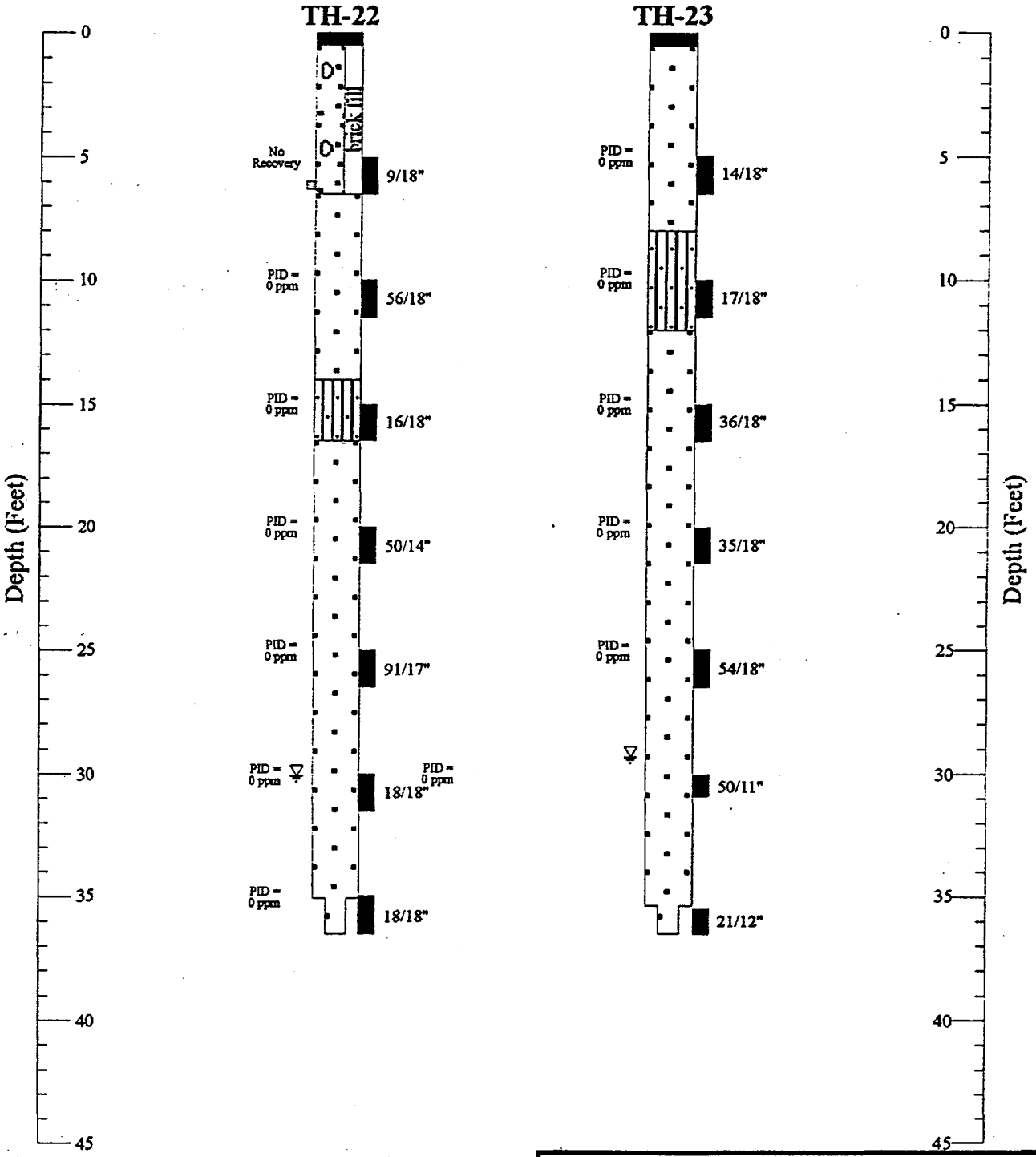
Logs of Soil Borings

Job 3008-020	Date 6/98	Figure 1/4

3008-02A 6.3.98 dh

SOIL BORING LOGS
I-70 & Brighton Boulevard
Western Boom (TH-22); OJ Valentine Lumber (TH-23)



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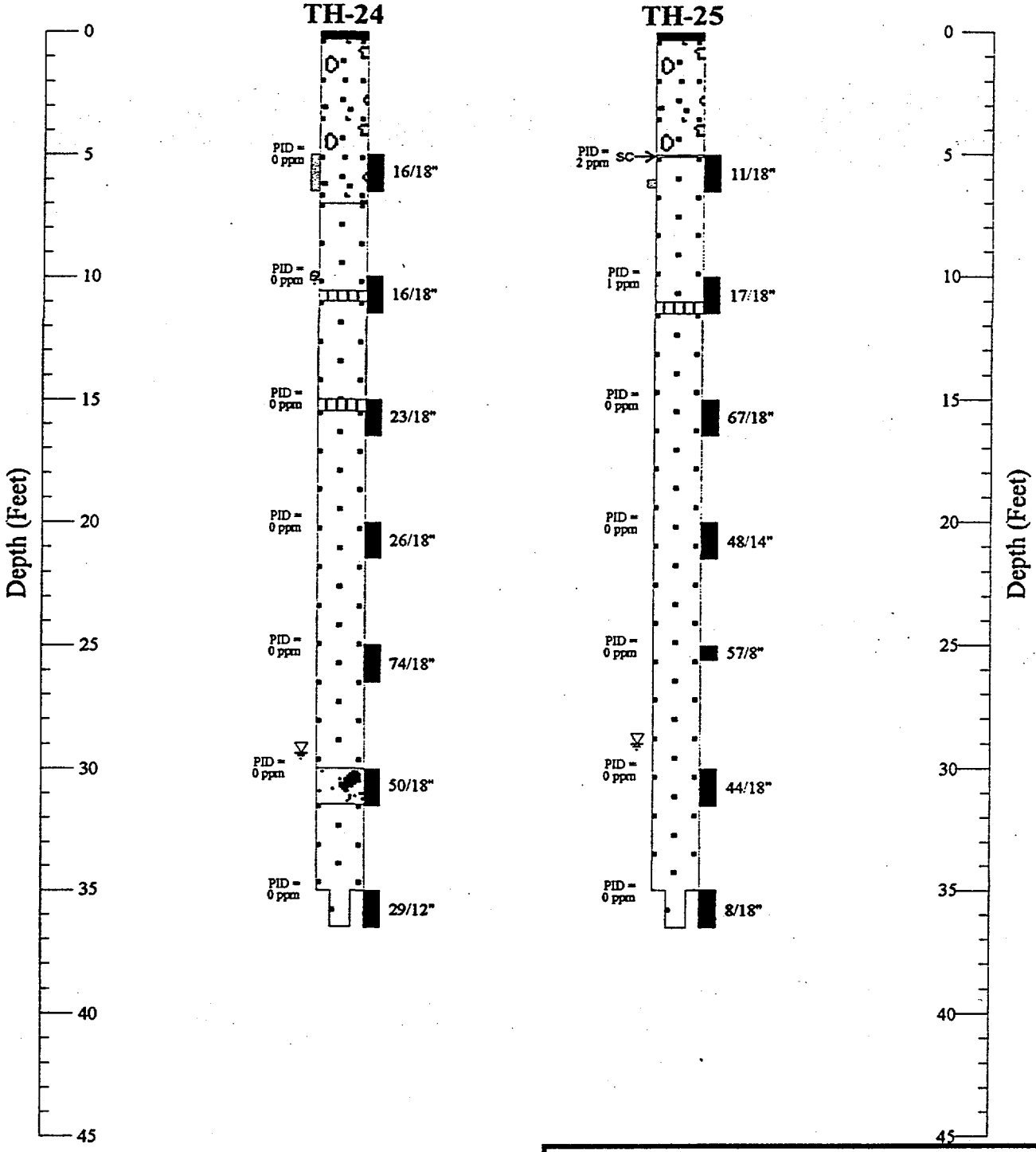
Logs of Soil Borings

Job 3008-020	Date 6/98	Figure 2/4

3008-02B 6.3.98 dh

SOIL BORING LOGS
I-70 & Brighton Boulevard
4614 Baldwin Court (TH-24); Lambert Auto Electric (TH-25)



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Logs of Soil Borings

Job 3008-020	Date 6/98	Figure 3/4

3008-02C 6.3.98 dh

LEGEND FOR SOIL BORING LOGS

I-70 & Brighton Boulevard

Units:

- fill
- GW well-graded gravel-sand mixtures
- SP poorly-graded sands
- SM silty sands, poorly-graded
- SC clayey sands, poorly-graded
- ML inorganic silts and very fine sands, or clayey silts with slight plasticity
- CL inorganic clays with low to medium plasticity

Symbols:

- asphalt
- staining present
- sampling interval
- water depth
- ? uncertainty
- 20/24" standard penetration test results (i.e., 20 blows to go 24 inches)
- PID photoionization detector readings/stainings

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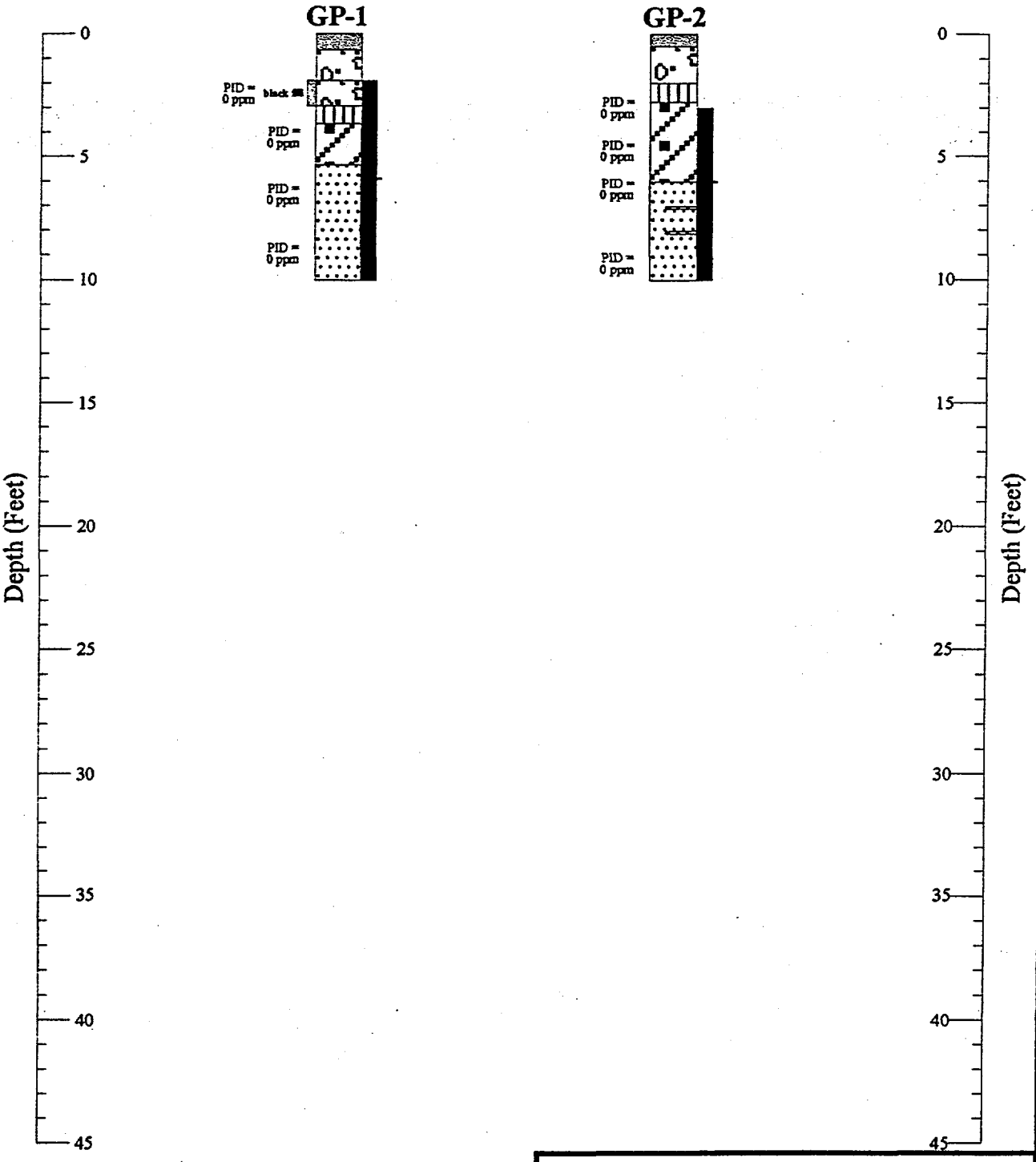
Legend for Soil Borings

Job 3008-020	Date 6/98	Figure 4/4

\3008-2Ke 6.3.98 dh

GEOPROBE LOGS
I-70 & Brighton Boulevard
4400-4500 Brighton Boulevard



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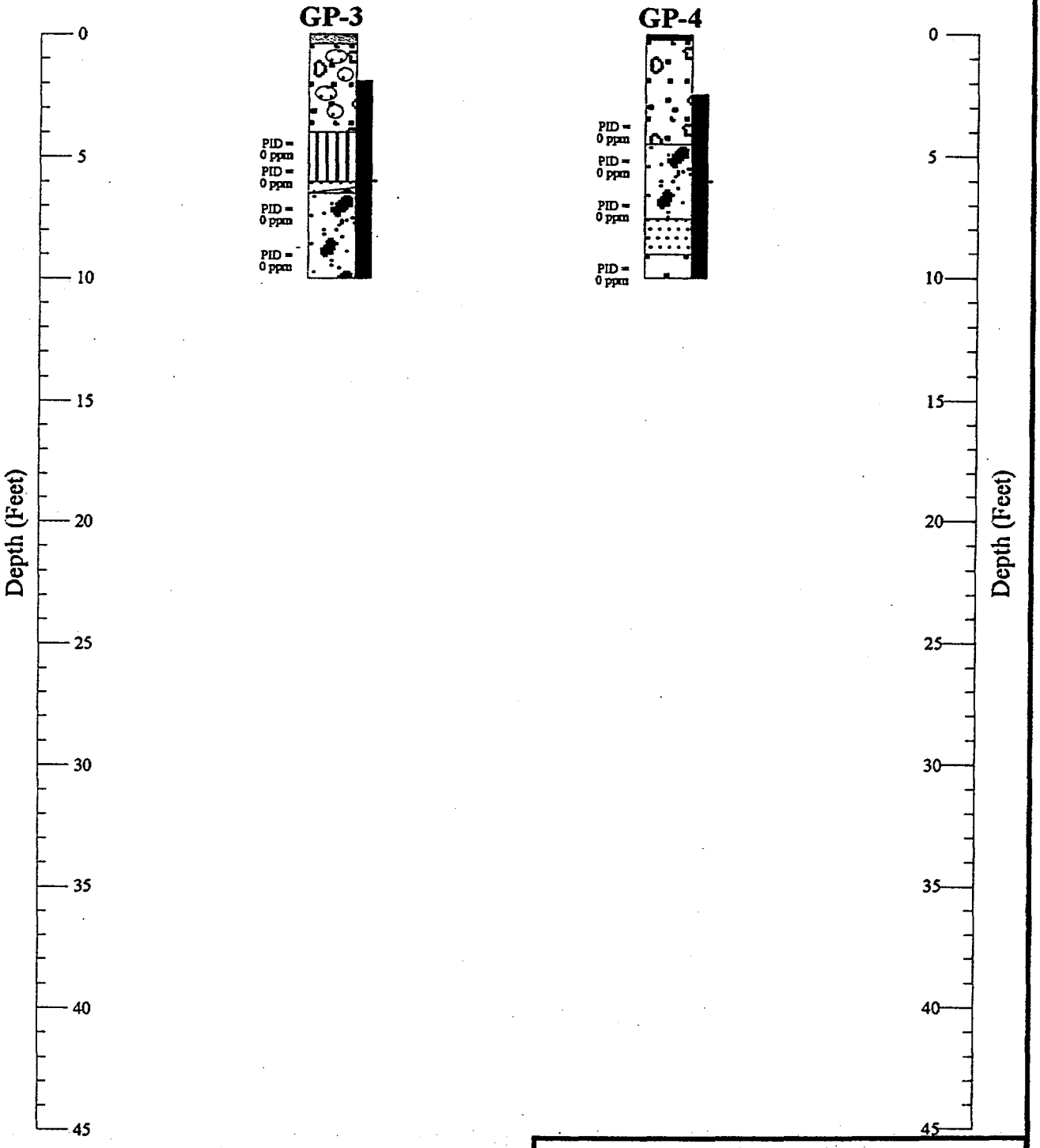
Geoprobe Logs

Job 3008-020	Date 6/98	Figure 1/3

3008-02E 6.3.98 dh

GEOPROBE LOGS
I-70 & Brighton Boulevard
4400-4500 Brighton Blvd. (GP-3);~4601 E. 46th Avenue (GP-4)



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Geoprobe Logs

Job 3008-020	Date 6/98	Figure 2/3

3008-02F 6.3.98 dh

LEGEND FOR GEOPROBE LOGS

I-70 & Brighton Boulevard

Units:

- fill
- GW well-graded gravel-sand mixtures
- SW well-graded sands
- SP poorly-graded sands
- SC clayey sands, poorly-graded
- ML inorganic silts and very fine sands, or clayey silts with slight plasticity

Symbols:

- asphalt
- concrete
- staining present
- sampling interval
- fine sandy layer
- cobbles
- gradational contact
- PID photoionization detector readings/stainings

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Legend for Geoprobe Logs

Job 3008-020	Date 6/98	Figure 3/3

3008-2K2 6.3.98 dh

APPENDIX 5.0

ANALYTICAL RESULTS

APPENDIX 5.1

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS (TEPH), TOTAL VOLATILE PETROLEUM HYDROCARBONS (TVPH), BENZENE, TOLUENE, ETHYLBENZENE, XYLENES (BTEX), AND METHYL TERT-BUTYL ETHER (MTBE) IN SOILS

Petroleum Hydrocarbons Report

3008-020; MW-2 5'

MW-2 = TH-19 RCG

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-10-4	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/15/98
Tag Number:	66597	Extractables Date Analyzed:	05/15/98
Date Sampled:	05/11/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	99 %
(SS) Fluorobenzene	91 %
(SS) o-Terphenyl	70 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-2 30'

MW-2 = TH-19 RCA

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-10-5	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/15/98
Tag Number:	66598	Extractables Date Analyzed:	05/15/98
Date Sampled:	05/11/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3	12	5	
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7	5.6	5	
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	99 %
(SS) Fluorobenzene	89 %
(SS) o-Terphenyl	67 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-1 30'

MW-1 = TH-20 RLG

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-10-1	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/15/98
Tag Number:	66593	Extractables Date Analyzed:	05/15/98
Date Sampled:	05/11/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	98 %
(SS) Fluorobenzene	88 %
(SS) o-Terphenyl	52 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-1 35'

MW-1 = TH-20 RLG

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-5-10-2	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/15/98
Tag Number:	66594	Extractables Date Analyzed:	05/15/98
Date Sampled:	05/11/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4	9.0	5	
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	97 %
(SS) Fluorobenzene	89 %
(SS) o-Terphenyl	66 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-3 5'

MW-3 = TH-21 RCG

EPA Method: 8021B/mod. 8015/mod. 8100/mod. 8021B
Analyst: RSW/DPD
Lab Sample ID: 98-5-10-7
Volatiles Date Analyzed: 05/14/98
Matrix: Soil
Date Extracted: 05/15/98
Tag Number: 66612
Extractables Date Analyzed: 05/15/98
Date Sampled: 05/11/98
Units: µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA	3,100	3000	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	98 %
(SS) Fluorobenzene	92 %
(SS) o-Terphenyl	72 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-3 30'

MW-3 = TH-21 RLG

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-5-10-8	Volatiles Date Analyzed:	05/15/98
Matrix:	Soil	Date Extracted:	05/15/98
Tag Number:	66615	Extractables Date Analyzed:	05/15/98
Date Sampled:	05/11/98	Units:	µg/Kg

Volatiles Dilution Factor: 50

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		250	U
Toluene	108-88-3		250	U
Ethylbenzene	100-41-4		250	U
Total Xylenes	1330-20-7	340	250	
MTBE	1634-04-4	1,200	250	
Total Volatile Hydrocarbons	NA		25000	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	96 %
(SS) Fluorobenzene	81 %
(SS) o-Terphenyl	64 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-4 10'

MW-4= TH-22 RCA

EPA Method: 8021B/mod. 8015/mod. 8100/mod. 8021B
Analyst: RSW/DPD
Lab Sample ID: 98-5-11-1
Volatiles Date Analyzed: 05/13/98
Matrix: Soil
Date Extracted: 05/18/98
Tag Number: 66600
Extractables Date Analyzed: 05/19/98
Date Sampled: 05/12/98
Units: µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	97 %
(SS) Fluorobenzene	92 %
(SS) o-Terphenyl	78 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-4 30'

MW-4 = TH-22 RCA

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-11-2	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	66601	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/12/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7	5.1	5	
MTBE	1634-04-4	8.7	5	
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	98 %
(SS) Fluorobenzene	90 %
(SS) o-Terphenyl	92 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-5 5'

MW-5 = TH-23 RCG

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-11-4	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	66605	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/12/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4	9.3	5	
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	90 %
(SS) Fluorobenzene	93 %
(SS) o-Terphenyl	90 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; MW-5 30'

MW-5 = TH-23 RC4

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-11-5	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	63609	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/12/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4	8.6	5	
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	92 %
(SS) Fluorobenzene	91 %
(SS) o-Terphenyl	132 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-24; (5-6.5')

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-14-1	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	55495	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/13/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4	12	5	
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA	17,000	3000	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	124 %
(SS) Fluorobenzene	113 %
(SS) o-Terphenyl	97 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-24; (25-31.5')

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-14-2	Volatiles Date Analyzed:	05/14/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	55497	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/13/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	95 %
(SS) Fluorobenzene	86 %
(SS) o-Terphenyl	89 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-25; (5-6.5')

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-14-4	Volatiles Date Analyzed:	05/13/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	55499	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/13/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3	18	5	
Ethylbenzene	100-41-4	6.1	5	
Total Xylenes	1330-20-7	34	5	
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA	4,400	3000	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	106 %
(SS) Fluorobenzene	107 %
(SS) o-Terphenyl	74 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-25; (25-31.5')

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	RSW/DPD
Lab Sample ID:	98-5-14-6	Volatiles Date Analyzed:	05/13/98
Matrix:	Soil	Date Extracted:	05/18/98
Tag Number:	55502	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/13/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	100 %
(SS) Fluorobenzene	94 %
(SS) o-Terphenyl	81 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; GP-1 1.9-2.9 ft

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-6-1-1	Volatiles Date Analyzed:	06/05/98
Matrix:	Soil	Date Extracted:	06/08/98
Tag Number:	55532	Extractables Date Analyzed:	06/09/98
Date Sampled:	06/01/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2	6.6	5	J
Toluene	108-88-3		5	UJ
Ethylbenzene	100-41-4	6.3	5	J
Total Xylenes	1330-20-7	11	5	J
MTBE	1634-04-4	94	5	J
Total Volatile Hydrocarbons	NA		500	UJ
Total Extractable Hydrocarbons	NA	13,000	3000	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	449 % *
(SS) Fluorobenzene	349 % *
(SS) o-Terphenyl	117 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; GP-1 1.9-10.0 ft

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-6-1-2	Volatiles Date Analyzed:	06/05/98
Matrix:	Soil	Date Extracted:	06/08/98
Tag Number:	55533	Extractables Date Analyzed:	06/09/98
Date Sampled:	06/01/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	UJ
Toluene	108-88-3		5	UJ
Ethylbenzene	100-41-4		5	UJ
Total Xylenes	1330-20-7		5	UJ
MTBE	1634-04-4	48	5	J
Total Volatile Hydrocarbons	NA		500	UJ
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	147 %
(SS) Fluorobenzene	135 %
(SS) o-Terphenyl	123 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; GP-2

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-6-1-3	Volatiles Date Analyzed:	06/05/98
Matrix:	Soil	Date Extracted:	06/08/98
Tag Number:	55535	Extractables Date Analyzed:	06/09/98
Date Sampled:	06/01/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	91 %
(SS) Fluorobenzene	82 %
(SS) o-Terphenyl	117 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; GP-3

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-6-1-4	Volatiles Date Analyzed:	06/05/98
Matrix:	Soil	Date Extracted:	06/08/98
Tag Number:	32954	Extractables Date Analyzed:	06/09/98
Date Sampled:	06/01/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	87 %
(SS) Fluorobenzene	83 %
(SS) o-Terphenyl	126 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; GP-4

EPA Method:	8021B/mod. 8015/mod. 8100/mod. 8021B	Analyst:	SBS
Lab Sample ID:	98-6-1-5	Volatiles Date Analyzed:	06/05/98
Matrix:	Soil	Date Extracted:	06/10/98
Tag Number:	32957	Extractables Date Analyzed:	06/11/98
Date Sampled:	06/01/98	Units:	µg/Kg

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Benzene	71-43-2		5	U
Toluene	108-88-3		5	U
Ethylbenzene	100-41-4		5	U
Total Xylenes	1330-20-7		5	U
MTBE	1634-04-4		5	U
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		3000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	90 %
(SS) Fluorobenzene	83 %
(SS) o-Terphenyl	103 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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ORGANIC CASE NARRATIVE

Project Name: I-70/Brighton Boulevard
Project Number: 3008-020
WALSH ID: 98-6-1

Five(15) soil samples were received June 1, 1998 by the WALSH Laboratory. The samples required analysis for BTEX, MTBE, TVH, TEH, 8260, and 8270. The samples were collected in the field on June 1, 1998 and preserved with ice. The samples were analyzed within holding times by the WALSH Laboratory.

All organic reports have been assembled and checked for completeness. All associated quality control and quality assurance criteria have been reviewed and verified. The BTEX and TVH internal standard responses for GP-1 1.9-2.9 ft and GP-1 1.9-10.0 ft are low and out of the working range of the methods. The samples were re-run to verify the low responses. The low responses are probable indications of a matrix effect. As a result, all associated results are qualified with a "J" to indicate that concentrations are estimated values.

Furthermore, the BTEX and TVH surrogates for GP-1 1.9-2.9 ft are high and out of the working range for the methods on the initial run and the re-run. Again, this is a probable indication of a matrix effect, and surrogates are qualified accordingly.

Stephanie Schiro
Analyst

4888 Pearl East Circle . Suite 108 . Boulder, Colorado . 80301-2475 . Phone (303) 443-3282 . FAX (303) 443-0367

APPENDIX 5.2

VOLATILE ORGANIC COMPOUNDS (VOCS) IN SOILS

Volatile Organic Compounds Report

3008-020; MW-2 COMP

Client Sample ID MW-2 = TH-19 RLG

Sample Tag No.: 66599
Lab Sample ID: S-98-5-10-6
Matrix: Soil
Data Filename: VOAA0986.D

EPA Method: 8260
Date Sampled: 05/11/98
Date Analyzed: 05/18/98
Analyst: RSW
Units: µg/Kg
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4		5	U
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; MW-2 COMP

Lab Sample ID: S-98-5-10-6

Client Sample ID MW-2 = TH-19 RCA

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	109 %	80 --- 120
(SS) Toluene-d8	93 %	81 --- 117
(SS) p-Bromofluorobenzene	79 %	74 --- 121

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; MW-2 COMP

Client Sample ID MW-2-TH-19 RC4

Sample Tag No.: 66599
Lab Sample ID: S-98-5-10-6
Matrix: Soil
Data Filename: VOAA0986.D

EPA Method: 8260
Date Analyzed: 05/18/98
Analyst: RSW
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; MW-4 5-36.5'

Client Sample ID MW-4= TH-22 pg4

Sample Tag No.: 66604
Lab Sample ID: S-98-5-11-3
Matrix: Soil
Data Filename: VOAA0987.D

EPA Method: 8260
Date Sampled: 05/12/98
Date Analyzed: 05/18/98
Analyst: RSW
Units: µg/Kg
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4		5	U
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; MW-4 5-36.5'

Lab Sample ID: S-98-5-11-3

Client Sample ID MW-4 = TH-22 RLG

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	105 %	80 --- 120
(SS) Toluene-d8	94 %	81 --- 117
(SS) p-Bromofluorobenzene	90 %	74 --- 121

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
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Volatile Organic Compounds Report

3008-020; MW-4 5-36.5'

Client Sample ID MW-4= TH-22 RLG

Sample Tag No.: 66604
Lab Sample ID: S-98-5-11-3
Matrix: Soil
Data Filename: VOAA0987.D

EPA Method: 8260
Date Analyzed: 05/18/98
Analyst: RSW
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

APPENDIX 5.3

SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCS) IN SOILS

Semivolatiles Report

3008-020; MW-2 Composite

Client Sample ID = TH-19 plus

Sample Tag No: 66608
Lab Sample ID: S-98-5-10-6
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1096.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; MW-2 Composite

Lab Sample ID: S-98-5-10-6

Client Sample ID: =TH-19 RCW

Dibenzofuran	132-64-9		330	U
2,4-Dinitrotoluene	606-20-2		330	U
2,6-Dinitrotoluene	121-14-2	500	330	
Diethylphthalate	84-66-2		330	U
4-Chlorophenyl phenyl ether	7005-72-3		330	U
Fluorene	86-73-7		330	U
4-Nitroaniline	100-01-6		660	U
4,6-Dinitro-2-methylphenol	534-52-1		1,650	U
N-Nitrosodiphenylamine	86-30-6		330	U
4-Bromophenyl-phenylether	101-55-3		330	U
Hexachlorobenzene	118-74-1		330	U
Pentachlorophenol	87-86-5		1,650	U
Phenanthrene	85-01-8		330	U
Anthracene	120-12-7		330	U
Carbazole	86-74-8		660	U
Di-n-butylphthalate	84-74-2		330	U
Fluoranthene	206-44-0		330	U
Pyrene	129-00-0		330	U
Butylbenzylphthalate	85-68-7		330	U
Benzo(a)anthracene	56-55-2		330	U
Chrysene	218-01-9		330	U
3,3'-Dichlorobenzidine	91-94-1		1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7		330	U
Di-n-octylphthalate	117-84-0		330	U
Benzo(b)fluoranthene	205-99-2		330	U
Benzo(k)fluoranthene	207-8-9		330	U
Benzo(a)pyrene	50-32-8		330	U
Indeno(1,2,3-cd)pyrene	193-39-5		660	U
Dibenz(a,h)anthracene	53-70-3		660	U
Benzo(g,h,i)perylene	191-24-2		660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	75 %	25 --- 121
(SS) Phenol-d5	85 %	24 --- 113
(SS) Nitrobenzene-d5	72 %	23 --- 120
(SS) 2-Fluorobiphenyl	85 %	30 --- 115
(SS) 2,4,6-Tribromophenol	88 %	19 --- 122
(SS) Terphenyl-d14	62 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Semivolatiles Report

3008-020; MW-2 Composite

= TH-19 RLG

Client Sample ID

Sample Tag No: 66608
Lab Sample ID: S-98-5-10-6
Matrix: Soil
Data Filename: BNAB1096.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were Found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Semivolatiles Report

3008-020; MW-1 Composite

Client Sample ID = TH-20 RCG

Sample Tag No: 66596
Lab Sample ID: S-98-5-10-3
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1095.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; MW-1 Composite

Lab Sample ID: S-98-5-10-3

Client Sample ID: =TH-20 RCW

Dibenzofuran	132-64-9	330	U
2,4-Dinitrotoluene	606-20-2	330	U
2,6-Dinitrotoluene	121-14-2	330	U
Diethylphthalate	84-66-2	330	U
4-Chlorophenyl phenyl ether	7005-72-3	330	U
Fluorene	86-73-7	330	U
4-Nitroaniline	100-01-6	660	U
4,6-Dinitro-2-methylphenol	534-52-1	1,650	U
N-Nitrosodiphenylamine	86-30-6	330	U
4-Bromophenyl-phenylether	101-55-3	330	U
Hexachlorobenzene	118-74-1	330	U
Pentachlorophenol	87-86-5	1,650	U
Phenanthrene	85-01-8	330	U
Anthracene	120-12-7	330	U
Carbazole	86-74-8	660	U
Di-n-butylphthalate	84-74-2	330	U
Fluoranthene	206-44-0	330	U
Pyrene	129-00-0	330	U
Butylbenzylphthalate	85-68-7	330	U
Benzo(a)anthracene	56-55-2	330	U
Chrysene	218-01-9	330	U
3,3'-Dichlorobenzidine	91-94-1	1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7	330	U
Di-n-octylphthalate	117-84-0	330	U
Benzo(b)fluoranthene	205-99-2	330	U
Benzo(k)fluoranthene	207-8-9	330	U
Benzo(a)pyrene	50-32-8	330	U
Indeno(1,2,3-cd)pyrene	193-39-5	660	U
Dibenz(a,h)anthracene	53-70-3	660	U
Benzo(g,h,i)perylene	191-24-2	660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	69 %	25 --- 121
(SS) Phenol-d5	78 %	24 --- 113
(SS) Nitrobenzene-d5	72 %	23 --- 120
(SS) 2-Fluorobiphenyl	81 %	30 --- 115
(SS) 2,4,6-Tribromophenol	83 %	19 --- 122
(SS) Terphenyl-d14	55 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Semivolatiles Report

3008-020; MW-1 Composite

TH-20 RLG

Client Sample ID

Sample Tag No: 66596
Lab Sample ID: S-98-5-10-3
Matrix: Soil
Data Filename: BNAB1095.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
Sulfur, Molecular (S8)	1900	T

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Semivolatiles Report

3008-020; MW-3 Composite

Client Sample ID = TH-21 RLG

Sample Tag No: 66614
Lab Sample ID: S-98-5-10-9
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1097.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; MW-3 Composite

Lab Sample ID: S-98-5-10-9

Client Sample ID: = TH-21 RLW

Dibenzofuran	132-64-9	330	U
2,4-Dinitrotoluene	606-20-2	330	U
2,6-Dinitrotoluene	121-14-2	330	U
Diethylphthalate	84-66-2	330	U
4-Chlorophenyl phenyl ether	7005-72-3	330	U
Fluorene	86-73-7	330	U
4-Nitroaniline	100-01-6	660	U
4,6-Dinitro-2-methylphenol	534-52-1	1,650	U
N-Nitrosodiphenylamine	86-30-6	330	U
4-Bromophenyl-phenylether	101-55-3	330	U
Hexachlorobenzene	118-74-1	330	U
Pentachlorophenol	87-86-5	1,650	U
Phenanthrene	85-01-8	330	U
Anthracene	120-12-7	330	U
Carbazole	86-74-8	660	U
Di-n-butylphthalate	84-74-2	330	U
Fluoranthene	206-44-0	330	U
Pyrene	129-00-0	330	U
Butylbenzylphthalate	85-68-7	330	U
Benzo(a)anthracene	56-55-2	330	U
Chrysene	218-01-9	330	U
3,3'-Dichlorobenzidine	91-94-1	1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7	330	U
Di-n-octylphthalate	117-84-0	330	U
Benzo(b)fluoranthene	205-99-2	330	U
Benzo(k)fluoranthene	207-8-9	330	U
Benzo(a)pyrene	50-32-8	330	U
Indeno(1,2,3-cd)pyrene	193-39-5	660	U
Dibenz(a,h)anthracene	53-70-3	660	U
Benzo(g,h,i)perylene	191-24-2	660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	57 %	25 --- 121
(SS) Phenol-d5	74 %	24 --- 113
(SS) Nitrobenzene-d5	53 %	23 --- 120
(SS) 2-Fluorobiphenyl	76 %	30 --- 115
(SS) 2,4,6-Tribromophenol	82 %	19 --- 122
(SS) Terphenyl-d14	74 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Semivolatiles Report

3008-020; MW-3 Composite

= TH-21 RLG

Client Sample ID

Sample Tag No: 66614
Lab Sample ID: S-98-5-10-9
Matrix: Soil
Data Filename: BNAB1097.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were Found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Semivolatiles Report

3008-020; MW-4 Composite

Client Sample ID = TH-22 RCC

Sample Tag No: 66604
Lab Sample ID: S-98-5-11-3
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1098.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; MW-4 Composite

= TH-22 12/16 Lab Sample ID: S-98-5-11-3

Client Sample ID:

Dibenzofuran	132-64-9	330	U
2,4-Dinitrotoluene	606-20-2	330	U
2,6-Dinitrotoluene	121-14-2	330	U
Diethylphthalate	84-66-2	330	U
4-Chlorophenyl phenyl ether	7005-72-3	330	U
Fluorene	86-73-7	330	U
4-Nitroaniline	100-01-6	660	U
4,6-Dinitro-2-methylphenol	534-52-1	1,650	U
N-Nitrosodiphenylamine	86-30-6	330	U
4-Bromophenyl-phenylether	101-55-3	330	U
Hexachlorobenzene	118-74-1	330	U
Pentachlorophenol	87-86-5	1,650	U
Phenanthrene	85-01-8	330	U
Anthracene	120-12-7	330	U
Carbazole	86-74-8	660	U
Di-n-butylphthalate	84-74-2	330	U
Fluoranthene	206-44-0	330	U
Pyrene	129-00-0	330	U
Butylbenzylphthalate	85-68-7	330	U
Benzo(a)anthracene	56-55-2	330	U
Chrysene	218-01-9	330	U
3,3'-Dichlorobenzidine	91-94-1	1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7	330	U
Di-n-octylphthalate	117-84-0	330	U
Benzo(b)fluoranthene	205-99-2	330	U
Benzo(k)fluoranthene	207-8-9	330	U
Benzo(a)pyrene	50-32-8	330	U
Indeno(1,2,3-cd)pyrene	193-39-5	660	U
Dibenz(a,h)anthracene	53-70-3	660	U
Benzo(g,h,i)perylene	191-24-2	660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	65 %	25 --- 121
(SS) Phenol-d5	80 %	24 --- 113
(SS) Nitrobenzene-d5	73 %	23 --- 120
(SS) 2-Fluorobiphenyl	77 %	30 --- 115
(SS) 2,4,6-Tribromophenol	75 %	19 --- 122
(SS) Terphenyl-d14	50 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Semivolatiles Report

3008-020; MW-4 Composite

Client Sample ID TH-22 12CG

Sample Tag No: 66604
Lab Sample ID: S-98-5-11-3
Matrix: Soil
Data Filename: BNAB1098.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were Found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Semivolatiles Report

3008-020; MW-5 Composite

Client Sample ID TH-23 RIG

Sample Tag No: 63608
Lab Sample ID: S-98-5-11-6
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1099.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; MW-5 Composite

Lab Sample ID: S-98-5-11-6

Client Sample ID: = TH-23 RCA

Dibenzofuran	132-64-9	330	U
2,4-Dinitrotoluene	606-20-2	330	U
2,6-Dinitrotoluene	121-14-2	330	U
Diethylphthalate	84-66-2	330	U
4-Chlorophenyl phenyl ether	7005-72-3	330	U
Fluorene	86-73-7	330	U
4-Nitroaniline	100-01-6	660	U
4,6-Dinitro-2-methylphenol	534-52-1	1,650	U
N-Nitrosodiphenylamine	86-30-6	330	U
4-Bromophenyl-phenylether	101-55-3	330	U
Hexachlorobenzene	118-74-1	330	U
Pentachlorophenol	87-86-5	1,650	U
Phenanthrene	85-01-8	330	U
Anthracene	120-12-7	330	U
Carbazole	86-74-8	660	U
Di-n-butylphthalate	84-74-2	330	U
Fluoranthene	206-44-0	330	U
Pyrene	129-00-0	330	U
Butylbenzylphthalate	85-68-7	330	U
Benzo(a)anthracene	56-55-2	330	U
Chrysene	218-01-9	330	U
3,3'-Dichlorobenzidine	91-94-1	1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7	330	U
Di-n-octylphthalate	117-84-0	330	U
Benzo(b)fluoranthene	205-99-2	330	U
Benzo(k)fluoranthene	207-8-9	330	U
Benzo(a)pyrene	50-32-8	330	U
Indeno(1,2,3-cd)pyrene	193-39-5	660	U
Dibenz(a,h)anthracene	53-70-3	660	U
Benzo(g,h,i)perylene	191-24-2	660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	67 %	25 --- 121
(SS) Phenol-d5	79 %	24 --- 113
(SS) Nitrobenzene-d5	76 %	23 --- 120
(SS) 2-Fluorobiphenyl	83 %	30 --- 115
(SS) 2,4,6-Tribromophenol	77 %	19 --- 122
(SS) Terphenyl-d14	81 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Semivolatiles Report

3008-020; MW-5 Composite

= T14-23 RC4

Client Sample ID

Sample Tag No: 63608
Lab Sample ID: S-98-5-11-6
Matrix: Soil
Data Filename: BNAB1099.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were Found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Semivolatiles Report

3008-020; TH-24, 5-36.5'

Client Sample ID

Sample Tag No: 55498
Lab Sample ID: S-98-5-14-3
Matrix: Soil
Date Extracted: 5/21/98
Data Filename: BNAB1102.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; TH-24, 5-36.5'

Lab Sample ID: S-98-5-14-3

Client Sample ID:

Dibenzofuran	132-64-9		330	U
2,4-Dinitrotoluene	606-20-2		330	U
2,6-Dinitrotoluene	121-14-2		330	U
Diethylphthalate	84-66-2		330	U
4-Chlorophenyl phenyl ether	7005-72-3		330	U
Fluorene	86-73-7		330	U
4-Nitroaniline	100-01-6		660	U
4,6-Dinitro-2-methylphenol	534-52-1		1,650	U
N-Nitrosodiphenylamine	86-30-6		330	U
4-Bromophenyl-phenylether	101-55-3		330	U
Hexachlorobenzene	118-74-1		330	U
Pentachlorophenol	87-86-5		1,650	U
Phenanthrene	85-01-8		330	U
Anthracene	120-12-7		330	U
Carbazole	86-74-8		660	U
Di-n-butylphthalate	84-74-2		330	U
Fluoranthene	206-44-0	510	330	
Pyrene	129-00-0	580	330	
Butylbenzylphthalate	85-68-7		330	U
Benzo(a)anthracene	56-55-2		330	U
Chrysene	218-01-9		330	U
3,3'-Dichlorobenzidine	91-94-1		1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7		330	U
Di-n-octylphthalate	117-84-0		330	U
Benzo(b)fluoranthene	205-99-2	330	330	
Benzo(k)fluoranthene	207-8-9		330	U
Benzo(a)pyrene	50-32-8	330	330	
Indeno(1,2,3-cd)pyrene	193-39-5		660	U
Dibenz(a,h)anthracene	53-70-3		660	U
Benzo(g,h,i)perylene	191-24-2		660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	68 %	25 --- 121
(SS) Phenol-d5	86 %	24 --- 113
(SS) Nitrobenzene-d5	79 %	23 --- 120
(SS) 2-Fluorobiphenyl	85 %	30 --- 115
(SS) 2,4,6-Tribromophenol	88 %	19 --- 122
(SS) Terphenyl-d14	58 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Semivolatiles Report

3008-020; TH-24, 5-36.5'

Client Sample ID

Sample Tag No: 55498
Lab Sample ID: S-98-5-14-3
Matrix: Soil
Data Filename: BNAB1102.D

Date Analyzed: 05/22/98
Analyst: DPD,RSW
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
UNKNOWN MULTI-RINGED AROMATIC	170	T

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Semivolatiles Report

3008-020; GP-4, 2.5-10'

Client Sample ID

Sample Tag No: 32956
Lab Sample ID: S-98-6-1-5
Matrix: Soil
Date Extracted: 6/13/98
Data Filename: BNAB1106.D

Date Analyzed: 06/18/98
Analyst: DPD
Dilution Factor: 1
EPA Method: 8270
Units: µg/Kg

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
N-Nitrosodimethylamine	62-75-9		660	U
Phenol	108-95-2		330	U
Bis(2-chloroethyl)ether	111-44-4		330	U
2-Chlorophenol	95-57-8		330	U
1,3-Dichlorobenzene	541-73-1		330	U
1,4-Dichlorobenzene	106-46-7		330	U
Benzyl Alcohol	100-51-6		660	U
1,2-Dichlorobenzene	95-50-1		330	U
2-Methylphenol	95-48-7		330	U
Bis(2-chloroisopropyl)ether	108-60-1		330	U
4-Methylphenol	106-44-5		330	U
N-nitrosodi-n-propylamine	621-64-7		330	U
Hexachloroethane	67-72-1		330	U
Nitrobenzene	98-95-3		330	U
Isophorone	78-59-1		330	U
2-Nitrophenol	88-75-5		330	U
2,4-Dimethylphenol	105-67-9		330	U
Bis(2-chloroethoxy)methane	111-91-1		330	U
Benzoic Acid	65-85-0		1,650	U
2,4-Dichlorophenol	120-83-2		330	U
1,2,4-Trichlorobenzene	120-82-1		330	U
Naphthalene	91-20-3		330	U
4-Chloroaniline	106-47-8		660	U
Hexachlorobutadiene	87-68-3		330	U
4-Chloro-3-methylphenol	59-50-7		660	U
2-Methylnaphthalene	91-57-6		330	U
Hexachlorocyclopentadiene	77-47-4		330	U
2,4,6-Trichlorophenol	88-06-2		330	U
2,4,5-Trichlorophenol	95-95-4		330	U
2-Chloronaphthalene	91-58-7		330	U
2-Nitroaniline	88-74-4		1,650	U
Dimethyl Phthalate	131-11-3		330	U
Acenaphthylene	208-96-8		330	U
3-Nitroaniline	99-09-2		1,650	U
Acenaphthene	83-32-9		330	U
2,4-Dinitrophenol	51-28-5		1,650	U
4-Nitrophenol	100-02-7		1,650	U

Semivolatiles Report

3008-020; GP-4, 2.5-10'

Client Sample ID:

Lab Sample ID: S-98-6-1-5

Dibenzofuran	132-64-9	330	U
2,4-Dinitrotoluene	606-20-2	330	U
2,6-Dinitrotoluene	121-14-2	330	U
Diethylphthalate	84-66-2	330	U
4-Chlorophenyl phenyl ether	7005-72-3	330	U
Fluorene	86-73-7	330	U
4-Nitroaniline	100-01-6	660	U
4,6-Dinitro-2-methylphenol	534-52-1	1,650	U
N-Nitrosodiphenylamine	86-30-6	330	U
4-Bromophenyl-phenylether	101-55-3	330	U
Hexachlorobenzene	118-74-1	330	U
Pentachlorophenol	87-86-5	1,650	U
Phenanthrene	85-01-8	330	U
Anthracene	120-12-7	330	U
Carbazole	86-74-8	660	U
Di-n-butylphthalate	84-74-2	330	U
Fluoranthene	206-44-0	330	U
Pyrene	129-00-0	330	U
Butylbenzylphthalate	85-68-7	330	U
Benzo(a)anthracene	56-55-2	330	U
Chrysene	218-01-9	330	U
3,3'-Dichlorobenzidine	91-94-1	1,650	U
Bis(2-ethylhexyl)phthalate	117-81-7	330	U
Di-n-octylphthalate	117-84-0	330	U
Benzo(b)fluoranthene	205-99-2	330	U
Benzo(k)fluoranthene	207-8-9	330	U
Benzo(a)pyrene	50-32-8	330	U
Indeno(1,2,3-cd)pyrene	193-39-5	660	U
Dibenz(a,h)anthracene	53-70-3	660	U
Benzo(g,h,i)perylene	191-24-2	660	U

Surrogate Compound	%Rec	Limits (%)
(SS) 2-Fluorophenol	77 %	25 --- 121
(SS) Phenol-d5	67 %	24 --- 113
(SS) Nitrobenzene-d5	80 %	23 --- 120
(SS) 2-Fluorobiphenyl	81 %	30 --- 115
(SS) 2,4,6-Tribromophenol	67 %	19 --- 122
(SS) Terphenyl-d14	50 %	18 --- 137

Qualifiers: "U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"*" Indicates surrogates low due to matrix effect.

Note: Method detection limits are approximately 1.5 of reporting limits.

Semivolatiles Report

3008-020; GP-4, 2.5-10'

Client Sample ID

Sample Tag No: 32956
Lab Sample ID: S-98-6-1-5
Matrix: Soil
Data Filename: BNAB1106.D

Date Analyzed: 06/18/98
Analyst: DPD
Dilution Factor: 1
Method: 8270
Units: µg/Kg

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were Found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

APPENDIX 5.4

METALS IN SOILS

SOIL CONCENTRATIONS OF METALS (mg/Kg) AND TYPICAL LOCAL AND REGIONAL RANGES - HUMBOLDT/44TH STREETS TO BRIGHTON BOULEVARD (WALSH 1991)															
Metal	CDOT Mean[1]	CDOT Range	Western U.S. Range[2]	U.S. Typical Range[3]	TH-6	TH-7	TH-9	TH-10	TH-11	TH-12	TH-13	TH-14	TH-15	TH-16	TH-18
Arsenic	5.5	ND[5]-13	0.1-40	1-40	0.6	0.9	ND	0.7	0.6	0.8	0.9	32	7.0	4.0	1.0
Barium	563	13-1000	100-3000	100-3000	23	82	38	37	33	33	72	540	150	260	56
Cadmium	1.83	ND-6	0.01-2	0.01-7	ND	ND	4	ND	ND	ND	ND	**13**	2	1.5	ND
Chromium	12.5	ND-14	5-1500	5-3000	ND	8	2	2	1	6	3	**32**	9	5	4
Lead	33	1.8-80	2-300	2-200	2.0	5.0	3.4	2.7	3.8	3.6	4.0	**710**	**170**	**210**	6.1
Mercury	<DL[4]-(0.1)	ND-0.2	0.01-0.055	0.010-0.08	ND	ND	ND	ND	ND	ND	ND	**1.7**	ND	ND	ND
Selenium	<DL-(10)	ND-2	0.01-12	0.1-2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	<DL-(1)	ND-1	0.01-8	0.1-5	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND
Beryllium	1	ND-1	0.01-0	0.01-40	ND	0.5	ND	ND	ND	ND	ND	0.6	ND	0.6	ND
Cobalt	15	ND-20	0.05-65	1-40	ND	5	5	ND	ND	3	2	6	5	3	3
Copper	38	4-54	2-250	2-100	4	11	ND	4	2	4	5	96	32	29	64
Iron	27600	2400-34000	NV	7000-550000	3000	9600	4000	3300	2500	5300	4000	11000	9400	7000	7500
Manganese	980	33-1700	200-10000	100-4000	55	160	120	190	120	120	140	230	340	180	120
Nickel	13.5	ND-22	2-750	5-1000	ND	6	2	2	ND	3	ND	11	6	5	3
Vanadium	64	3-90	3-500	20-500	5	16	7	6	4	9	8	17	14	11	15
Zinc	132	9-330	1-900	10-300	14	44	18	12	10	16	13	**740**	230	180	21

(1) Calculated from 71 soil samples collected from CDOT projects in the Denver Metro Area.
(2) Bowen, 1979
(3) Dragun, 1988
(4) Detection Limit
(5) Not Detected
Bold numbers exceed U.S. Typical Ranges or local CDOT ranges for a particular metal.
TCLP values in parentheses.

Sample: 01A MW-1 = TH-20 RCG Collected: 05/11/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		7.1		5.6	mg/Kg-DRY	05/21/98
Barium		53		0.45	mg/Kg-DRY	05/21/98
Cadmium		ND		0.56	mg/Kg-DRY	05/21/98
Chromium		5.7		1.1	mg/Kg-DRY	05/21/98
Lead		ND		5.6	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.56	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.063	mg/Kg	05/18/98
Percent Moisture	ASTM D2216	10.8		0.1	WT%	05/18/98

Sample: 02A MW-2 = TH-19 RCG Collected: 05/11/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		7.6		5.4	mg/Kg-DRY	05/21/98
Barium		100		0.43	mg/Kg-DRY	05/21/98
Cadmium		ND		0.54	mg/Kg-DRY	05/21/98
Chromium		8.7		1.1	mg/Kg-DRY	05/21/98
Lead		7.3		5.4	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.54	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.095	mg/Kg	05/18/98
Percent Moisture	ASTM D2216	7.50		0.1	WT%	05/18/98

Sample: 03A MW-3 = TH-21 RCG Collected: 05/01/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		ND		5.3	mg/Kg-DRY	05/21/98
Barium		24		0.42	mg/Kg-DRY	05/21/98
Cadmium		ND		0.53	mg/Kg-DRY	05/21/98
Chromium		2.5		1.1	mg/Kg-DRY	05/21/98
Lead		ND		5.3	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.53	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.071	mg/Kg	05/18/98
Percent Moisture	ASTM D2216	5.80		0.1	WT%	05/18/98

Sample: 01A MW-4 TAG # 66602 Collected: 05/12/98 Matrix: SOIL
= TH-22 RLG

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		ND		5.4	mg/Kg-DRY	05/21/98
Barium		29		0.43	mg/Kg-DRY	05/21/98
Cadmium		ND		0.54	mg/Kg-DRY	05/21/98
Chromium		3.2		1.1	mg/Kg-DRY	05/21/98
Lead		5.6		5.4	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.54	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.11	mg/Kg-DRY	05/20/98
Percent Moisture	ASTM D2216	7.10		0.1	WT%	05/18/98

Sample: 02A MW-5 TAG # 66606 Collected: 05/12/98 Matrix: SOIL
= TH-23 RLG

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		6.4		5.7	mg/Kg-DRY	05/21/98
Barium		33		0.46	mg/Kg-DRY	05/21/98
Cadmium		ND		0.57	mg/Kg-DRY	05/21/98
Chromium		3.9		1.1	mg/Kg-DRY	05/21/98
Lead		ND		5.7	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.57	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.11	mg/Kg-DRY	05/20/98
Percent Moisture	ASTM D2216	12.8		0.1	WT%	05/18/98

Sample: 03A TH-24 (5-36.5) TAG #5549 Collected: 05/13/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		11		5.5	mg/Kg-DRY	05/21/98
Barium		150		0.44	mg/Kg-DRY	05/21/98
Cadmium		ND		0.55	mg/Kg-DRY	05/21/98
Chromium		12		1.1	mg/Kg-DRY	05/21/98
Lead		32		5.5	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.55	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	0.13		0.11	mg/Kg-DRY	05/20/98
Percent Moisture	ASTM D2216	8.70		0.1	WT%	05/18/98

Sample: 04A TH-25 (5-36.5) TAG #5550 Collected: 05/13/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals - RCRA, Total	SW 6010A					
Arsenic		6.9		5.4	mg/Kg-DRY	05/21/98
Barium		62		0.43	mg/Kg-DRY	05/21/98
Cadmium		ND		0.54	mg/Kg-DRY	05/21/98
Chromium		5.8		1.1	mg/Kg-DRY	05/21/98
Lead		53		5.4	mg/Kg-DRY	05/21/98
Selenium		ND		11	mg/Kg-DRY	05/21/98
Silver		ND		0.54	mg/Kg-DRY	05/21/98
Mercury, Total	245.5/7471	ND		0.11	mg/Kg-DRY	05/20/98
Percent Moisture	ASTM D2216	6.60		0.1	WT%	05/18/98

Sample: **01A** **GP-1 (1.9-2.9) TAG #55531** Collected: **06/01/98** Matrix: **SOIL**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Total	SW 6010A					
Arsenic		93		7.1	mg/Kg-DRY	06/04/98
Barium		800		0.57	mg/Kg-DRY	06/04/98
Cadmium		3.1		0.71	mg/Kg-DRY	06/04/98
Chromium		10		1.4	mg/Kg-DRY	06/04/98
Lead		970		7.1	mg/Kg-DRY	06/04/98
Selenium		ND		14	mg/Kg-DRY	06/04/98
Silver		4.3		0.71	mg/Kg-DRY	06/04/98
Mercury, Total	245.5/7471	ND		0.14	mg/Kg-DRY	06/05/98
Percent Moisture	ASTM D2216	29.4		0.1	WT%	06/04/98

Sample: **02A** **GP-1 (1.9-10) TAG #55534** Collected: **06/01/98** Matrix: **SOIL**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Total	SW 6010A					
Arsenic		6.3		5.7	mg/Kg-DRY	06/04/98
Barium		70		0.45	mg/Kg-DRY	06/04/98
Cadmium		ND		0.57	mg/Kg-DRY	06/04/98
Chromium		7.1		1.1	mg/Kg-DRY	06/04/98
Lead		ND		5.7	mg/Kg-DRY	06/04/98
Selenium		ND		11	mg/Kg-DRY	06/04/98
Silver		ND		0.57	mg/Kg-DRY	06/04/98
Mercury, Total	245.5/7471	ND		0.11	mg/Kg-DRY	06/05/98
Percent Moisture	ASTM D2216	11.8		0.1	WT%	06/04/98

Order # 98-06-113
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Walsh Environmental Inc.
TEST RESULTS by SAMPLE

Sample: 01A GP-1 (1.9-2.9) TAG #5553 Collected: 06/01/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, TCLP Extracted	SW 3010/6010					
Arsenic		ND		0.050	mg/L	06/15/98
Lead		0.24		0.050	mg/L	06/15/98

Sample: 03A GP-2 (3-10) TAG #55536 Collected: 06/01/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Total	SW 6010A					
Arsenic		ND		5.1	mg/Kg-DRY	06/04/98
Barium		4.7		0.41	mg/Kg-DRY	06/04/98
Cadmium		ND		0.51	mg/Kg-DRY	06/04/98
Chromium		ND		1.0	mg/Kg-DRY	06/04/98
Lead		ND		5.1	mg/Kg-DRY	06/04/98
Selenium		ND		10	mg/Kg-DRY	06/04/98
Silver		ND		0.51	mg/Kg-DRY	06/04/98
Mercury, Total	245.5/7471	ND		0.10	mg/Kg-DRY	06/05/98
Percent Moisture	ASTM D2216	1.30		0.1	WT%	06/04/98

Sample: 04A GP-3 (4-10) TAG #32953 Collected: 06/01/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Total	SW 6010A					
Arsenic		ND		5.1	mg/Kg-DRY	06/04/98
Barium		24		0.41	mg/Kg-DRY	06/04/98
Cadmium		ND		0.51	mg/Kg-DRY	06/04/98
Chromium		2.0		1.0	mg/Kg-DRY	06/04/98
Lead		ND		5.1	mg/Kg-DRY	06/04/98
Selenium		ND		10	mg/Kg-DRY	06/04/98
Silver		ND		0.51	mg/Kg-DRY	06/04/98
Mercury, Total	245.5/7471	ND		0.10	mg/Kg-DRY	06/05/98
Percent Moisture	ASTM D2216	2.00		0.1	WT%	06/04/98

Sample: 05A GP-4 (2.5-10) TAG #32958 Collected: 06/01/98 Matrix: SOIL

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Total	SW 6010A					
Arsenic		ND		5.1	mg/Kg-DRY	06/04/98
Barium		12		0.40	mg/Kg-DRY	06/04/98
Cadmium		ND		0.51	mg/Kg-DRY	06/04/98
Chromium		1.8		1.0	mg/Kg-DRY	06/04/98
Lead		ND		5.1	mg/Kg-DRY	06/04/98
Selenium		ND		10	mg/Kg-DRY	06/04/98
Silver		ND		0.51	mg/Kg-DRY	06/04/98
Mercury, Total	245.5/7471	ND		0.10	mg/Kg-DRY	06/05/98
Percent Moisture	ASTM D2216	1.20		0.1	WT%	06/04/98

APPENDIX 5.5

VOLATILE ORGANIC COMPOUNDS (VOCS) IN GROUND WATER

Volatile Organic Compounds Report

3008-020; TH-19

Client Sample ID

Sample Tag No.: 55515, 55516
Lab Sample ID: W-98-5-33-4
Matrix: Water
Data Filename: VOAA2006.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	140	5	
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; TH-19

Client Sample ID

Lab Sample ID: W-98-5-33-4

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	106 %	86 --- 118
(SS) Toluene-d8	104 %	88 --- 110
(SS) p-Bromofluorobenzene	98 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-19

Client Sample ID

Sample Tag No.: 55515, 55516
Lab Sample ID: W-98-5-33-4
Matrix: Water
Data Filename: VOAA2006.D

EPA Method: 8260
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
Unknown Conjugated Compound	8.6	T

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-20

Client Sample ID

Sample Tag No.: 55512, 55513
Lab Sample ID: W-98-5-33-3
Matrix: Water
Data Filename: VOAA2005.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	8.1	5	
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-20

Client Sample ID

Lab Sample ID: W-98-5-33-3

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	104 %	86 --- 118
(SS) Toluene-d8	97 %	88 --- 110
(SS) p-Bromofluorobenzene	93 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-20

Client Sample ID

Sample Tag No.: 55507, 55508
Lab Sample ID: W-98-5-33-3
Matrix: Water
Data Filename: VOAA2005.D

EPA Method: 8260
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-21

Client Sample ID

Sample Tag No.: 55523, 55524
Lab Sample ID: W-98-5-33-6
Matrix: Water
Data Filename: VOAA2008.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2	12	5	
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	7.8	5	
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; TH-21
Client Sample ID

Lab Sample ID: W-98-5-33-6

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	98 %	86 --- 118
(SS) Toluene-d8	100 %	88 --- 110
(SS) p-Bromofluorobenzene	92 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-21

Client Sample ID

Sample Tag No.: 55523, 55524
Lab Sample ID: W-98-5-33-6
Matrix: Water
Data Filename: VOAA2008.D

EPA Method: 8260
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-22

Client Sample ID

Sample Tag No.: 55519, 55520
Lab Sample ID: W-98-5-33-5
Matrix: Water
Data Filename: VOAA2007.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2	19	5	
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	17	5	
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

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Volatile Organic Compounds Report

3008-020; TH-22

Client Sample ID

Lab Sample ID: W-98-5-33-5

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	98 %	86 --- 118
(SS) Toluene-d8	97 %	88 --- 110
(SS) p-Bromofluorobenzene	93 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-22

Client Sample ID

Sample Tag No.: 55519, 55520
Lab Sample ID: W-98-5-33-5
Matrix: Water
Data Filename: VOAA2007.D

EPA Method: 8260
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

Walsh
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Volatile Organic Compounds Report

3008-020; TH-23

Client Sample ID

Sample Tag No.: 55507, 55508
Lab Sample ID: W-98-5-33-2
Matrix: Water
Data Filename: VOAA2004.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L
Dilution Factor: 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	31	5	
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; TH-23
Client Sample ID

Lab Sample ID: W-98-5-33-2

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	101 %	86 --- 118
(SS) Toluene-d8	97 %	88 --- 110
(SS) p-Bromofluorobenzene	94 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
Environmental Scientists and Engineers, Inc.

Volatile Organic Compounds Report

3008-020; TH-23

Client Sample ID

Sample Tag No.: 55507, 55508
Lab Sample ID: W-98-5-33-2
Matrix: Water
Data Filename: VOAA2004.D

EPA Method: 8260
Date Analyzed: 06/01/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

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Volatile Organic Compounds Report

3008-020; TH-24

Client Sample ID

Sample Tag No.: 55504, 55505
Lab Sample ID: W-98-5-33-1
Matrix: Water
Data Filename: VOAA2003.D

EPA Method: 8260
Date Sampled: 05/26/98
Date Analyzed: 6/1,4/98
Analyst: SBS
Units: µg/L
Dilution Factor: 5, 1

Analyte	CAS Number	Concentration	Quantitation Limits	Qualifier
Dichlorodifluoromethane	75-71-8		10	U
Chloromethane	74-87-3		10	U
Vinyl Chloride	75-01-4		5	U
Bromomethane	74-97-5		10	U
Chloroethane	75-00-3		10	U
Trichlorofluoromethane	75-69-4		10	U
1,1-Dichloroethene	75-35-4		5	U
Methylene Chloride	75-09-2		5	U
trans-1,2-Dichloroethene	156-60-5		5	U
1,1-Dichloroethane	75-34-3		5	U
cis-1,2-Dichloroethene	156-59-2		5	U
2,2-Dichloropropane	594-20-7		5	U
Bromochloromethane	74-97-5		5	U
Chloroform	67-66-3		5	U
1,1,1-Trichloroethane	71-55-6		5	U
1,1-Dichloropropene	563-58-6		5	U
Carbon Tetrachloride	56-23-5		5	U
1,2-Dichloroethane	107-06-2		5	U
Benzene	71-43-2		5	U
Trichloroethene	79-01-6		5	U
1,2-Dichloropropane	78-87-5		5	U
Dibromomethane	74-95-3		5	U
Bromodichloromethane	75-27-4		5	U
trans-1,3-Dichloropropene	10061-02-6		5	U
Toluene	108-88-3		5	U
cis-1,3-Dichloropropene	10061-01-5		5	U
1,1,2-Trichloroethane	79-00-5		5	U
1,2-Dibromoethane	106-93-4		5	U
1,3-Dichloropropane	142-28-9		5	U
Tetrachloroethene	127-18-4	530	25	D
Dibromochloromethane	124-48-1		5	U
Chlorobenzene	108-90-7		5	U
1,1,1,2-Tetrachloroethane	630-20-6		5	U
Ethylbenzene	100-41-4		5	U
m & p-Xylenes			5	U

Volatile Organic Compounds Report

3008-020; TH-24	Lab Sample ID: W-98-5-33-1
Client Sample ID	

o-Xylene	106-42-3		5	U
Styrene	100-42-5		5	U
Bromoform	75-25-2		5	U
Isopropylbenzene	98-82-8		5	U
1,1,2,2-Tetrachloroethane	79-34-5		5	U
Bromobenzene	108-86-1		5	U
1,2,3-Trichloropropane	96-18-4		5	U
n-Propylbenzene	103-65-1		5	U
2-Chlorotoluene	95-49-8		5	U
1,3,5-Trimethylbenzene	108-67-8		5	U
4-Chlorotoluene	106-43-4		5	U
t-Butylbenzene	98-06-6		5	U
1,2,4-Trimethylbenzene	95-63-6		5	U
s-Butylbenzene	135-98-8		5	U
1,3-Dichlorobenzene	541-73-1		5	U
p-Isopropyltoluene	99-87-6		5	U
1,4-Dichlorobenzene	106-46-7		5	U
n-Butylbenzene	104-51-8		5	U
1,2-Dichlorobenzene	95-50-1		5	U
1,2-Dibromo-3-chloropropane	96-12-8		5	U
1,2,4-Trichlorobenzene	120-82-1		5	U
Hexachlorobutadiene	87-68-3		5	U
Naphthalene	91-20-3		10	U
1,2,3-Trichlorobenzene	87-61-6		5	U

Surrogate Compound	%Rec	Recovery Limits (%)
(SS) Dibromofluoromethane	97 %	86 --- 118
(SS) Toluene-d8	103 %	88 --- 110
(SS) p-Bromofluorobenzene	101 %	86 --- 116

Qualifiers:

"U" Indicates compound was searched for and not detected.
"B" Indicates compound was found in the method blank.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
"D" Indicates compound was run at a dilution.
"*" Indicates surrogate recovery is not within method limits due to matrix effect.

Note: Method detection limits are approximately 1/5 of reporting limits.

Walsh
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Volatile Organic Compounds Report

3008-020; TH-24

Client Sample ID

Sample Tag No.: 55504, 55505
Lab Sample ID: W-98-5-33-1
Matrix: Water
Data Filename: VOAA2003.D

EPA Method: 8260
Date Analyzed: 6/1,4/98
Analyst: SBS
Units: µg/L

Tentatively Identified Compound	Concentration	Qualifier
No Tentatively Identified Compounds were found.		

Qualifier:

"T" Indicates compound was tentatively identified by its mass spectrum.
All tentatively identified compounds are estimated values.

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APPENDIX 5.6

TOTAL VOLATILE PETROLEUM HYDROCARBONS (TVPH) AND TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS (TEPH) IN GROUND WATER

Petroleum Hydrocarbons Report

3008-020; TH-10

EPA Method:	mod. 8015/mod. 8100	Analyst:	RSW/DPD
Lab Sample ID:	98-5-8-3	Volatiles Date Analyzed:	05/11/98
Matrix:	Water	Date Extracted:	05/15/98
Tag Number:	55492, -493, -494	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/08/98	Units:	µg/L

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA	770	500	
Total Extractable Hydrocarbons	NA	1100	1000	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	110 %
(SS) Fluorobenzene	122 %
(SS) o-Terphenyl	19 % *

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-16

EPA Method:	mod. 8015/mod. 8100	Analyst:	RSW/DPD
Lab Sample ID:	98-5-8-1	Volatiles Date Analyzed:	05/11/98
Matrix:	Water	Date Extracted:	05/15/98
Tag Number:	64496, -497, -498	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/08/98	Units:	µg/L

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA	740	500	
Total Extractable Hydrocarbons	NA		1000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	81 %
(SS) Fluorobenzene	106 %
(SS) o-Terphenyl	67 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.

"B" Indicates compound was found in the method blank and has been corrected.

"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.

" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-18

EPA Method:	mod. 8015/mod. 8100	Analyst:	RSW/DPD
Lab Sample ID:	98-5-8-2	Volatiles Date Analyzed:	05/14/98
Matrix:	Water	Date Extracted:	05/15/98
Tag Number:	64500, -501, -502	Extractables Date Analyzed:	05/19/98
Date Sampled:	05/08/98	Units:	µg/L

Volatiles Dilution Factor: 1

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U
Total Extractable Hydrocarbons	NA		1000	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	80 %
(SS) Fluorobenzene	69 %
(SS) o-Terphenyl	73 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-19

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-4
Matrix: Water
Tag Number: 55515, 55516
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	87 %
(SS) Fluorobenzene	81 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-19

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-11	Date Extracted:	6/3/98
Matrix:	Water	Extractables Date Analyzed:	6/10/98
Tag Number:	55517	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	91 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-20

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-3
Matrix: Water
Tag Number: 55512, 55513
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	83 %
(SS) Fluorobenzene	77 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-20

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-10	Date Extracted:	6/3/98
Matrix:	Water	Extractables Date Analyzed:	6/8/98
Tag Number:	55514	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	87 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-21

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-6
Matrix: Water
Tag Number: 55523, 55524
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	86 %
(SS) Fluorobenzene	78 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-21

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-13	Date Extracted:	6/3/98
Matrix:	Water	Extractables Date Analyzed:	6/8/98
Tag Number:	55525	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	82 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-22

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-5
Matrix: Water
Tag Number: 55519, 55520
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	86 %
(SS) Fluorobenzene	77 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

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Petroleum Hydrocarbons Report

3008-020; TH-22

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-12	Date Extracted:	6/3/98
Matrix:	Water	Extractables Date Analyzed:	6/8/98
Tag Number:	55521	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	73 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh

Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-23

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-2
Matrix: Water
Tag Number: 55507, 55508
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	90 %
(SS) Fluorobenzene	78 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh
Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-23

Client Sample ID

EPA Method: Mod. 8100
Lab Sample ID: 98-5-33-9
Matrix: Water
Tag Number: 55509
Date Sampled: 5/26/98

Analyst: DPD
Date Extracted: 6/1/98
Extractables Date Analyzed: 6/4/98
Units: mg/L

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	75 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh
Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-24

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-1
Matrix: Water
Tag Number: 55504, 55505
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA	1100	500	

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	87 %
(SS) Fluorobenzene	79 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh
Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-24

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-8	Date Extracted:	6/1/98
Matrix:	Water	Extractables Date Analyzed:	6/4/98
Tag Number:	55506	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	77 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh

Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-25

EPA Method: mod. 8015
Lab Sample ID: 98-5-33-7
Matrix: Water
Tag Number: 55528, 55529
Date Sampled: 05/26/98

Analyst: DPD
Volatiles Date Analyzed: 06/01/98
Units: µg/L

Volatiles Dilution Factor: 1

Analyte	CAS Number	Concentration	Reporting Limits	Qualifier
Total Volatile Hydrocarbons	NA		500	U

Surrogate Compound	%Recovery
(SS) a,a,a-Trifluorotoluene	83 %
(SS) Fluorobenzene	77 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh
Environmental Scientists and Engineers, Inc.

Petroleum Hydrocarbons Report

3008-020; TH-25

Client Sample ID

EPA Method:	Mod. 8100	Analyst:	DPD
Lab Sample ID:	98-5-33-14	Date Extracted:	6/3/98
Matrix:	Water	Extractables Date Analyzed:	6/8/98
Tag Number:	55530	Units:	mg/L
Date Sampled:	5/26/98		

Extractables Dilution Factor: 1

Analyte	CAS Number	Concentration	Detection Limits	Qualifier
Total Extractable Hydrocarbons	NA		1	U

Surrogate Compound	%Recovery
(SS) o-Terphenyl	76 %

Qualifiers:

"U" Indicates compound was searched for and not detected at or above the method detection limit.
"B" Indicates compound was found in the method blank and has been corrected.
"J" Indicates compound was identified out of the method working limits and should be considered an estimated value.
" * " Indicates surrogate is outside of recovery limits due to matrix effect.

Walsh
Environmental Scientists and Engineers, Inc.

APPENDIX 5.7

METALS IN GROUND WATER

METALS IN GROUND WATER (mg/L) - WALSH 1991 MONITOR WELLS HUMBOLDT/44TH STREETS TO BRIGHTON BOULEVARD

Metal	TH-6	TH-7	TH-9	TH-10	TH-11	TH-12	TH-13	TH-14	TH-15	TH-16	TH-18	CGWS[1] (mg/L)
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004	ND	0.05
Barium	0.05	0.13	0.06	0.15	0.05	0.06	0.11	0.05	0.04	0.06	0.04	1.0
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.005
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Lead	ND	ND	ND	0.002	ND	ND	ND	ND	0.002	0.005	ND	0.05
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0002	0.002
Selenium	0.004	ND	ND	ND	0.005	0.003	0.003	0.003	0.007	0.005	0.004	0.01
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Copper	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Iron	ND	ND	ND	ND	ND	0.02	ND	ND	ND	ND	ND	
Manganese	ND	3.6	ND	3.9	0.04	0.21	5.0	0.03	0.12	0.42	ND	
Nickel	ND	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	
Vanadium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Zinc	ND	ND	ND	ND	ND	0.03	ND	ND	ND	0.02	ND	

[1] = Colorado Ground Water Standards, Human Health Standards (CDH, 1995). Bold values exceed CGWSs.
ND = not detected

Sample: **01A TH-24 TAG #55503** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.055		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

Sample: **02A TH-23 TAG #55510** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.055		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

Sample: **03A TH-20 TAG #55511** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.046		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

Sample: **04A TH-19 TAG #55518** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.049		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/05/98

Sample: **05A TH-22 TAG #55522** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.051		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

Sample: **06A TH-21 TAG #55526** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.057		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

Sample: **07A TH-25 TAG #55527** Collected: **05/26/98** Matrix: **WATER**

Test Description	Method	Result	Q	Limit	Units	Analyzed
ICP Metals, Dissolved	SW 6010A					
Arsenic		ND		0.050	mg/L	05/30/98
Barium		0.045		0.0040	mg/L	05/30/98
Cadmium		ND		0.0050	mg/L	05/30/98
Chromium		ND		0.010	mg/L	05/30/98
Lead		ND		0.050	mg/L	05/30/98
Selenium		ND		0.10	mg/L	05/30/98
Silver		ND		0.0050	mg/L	05/30/98
Mercury, Dissolved	245.1/7470	ND		0.00020	mg/L	06/01/98

APPENDIX 6.0

GROUND WATER DISCHARGE PARAMETER RESULTS

DISCHARGE PARAMETER RESULTS - WALSH 1991 HUMBOLDT/44TH STREETS TO BRIGHTON BOULEVARD							
Location	**Alkalinity (mg/L)**	**TDS (mg/L)**	**Oil & Grease (mg/L)**	**COD (mg/L)**	**pH (units)**	**TSS (mg/L)**	**Gross Alpha Gross Beta (pCi/L)**
TH-6	370	1100	ND	7	6.9	**53000**	No Data
TH-7	460	990	3	17	6.6	**9800**	**131+/-40** 38.1+/-17.6
TH-9	420	920	ND	16	6.7	**17000**	**109+/-30** 33.6+/-17.6
TH-10	520	1000	ND	82	7.0	**17000**	No Data
TH-11	440	1000	ND	9	7.1	**6000**	-1.0 3+/-13
TH-12	460	1000	2	5	7.1	**11000**	No Data
TH-13	590	1100	ND	51	7.2	**21000**	**88+/-31** 10+/-13
TH-14	450	1000	ND	18	7.1	**5400**	No Data
TH-15	390	1000	ND	10	7.2	**3200**	**83+/-39** 25+/-18
Colorado Standard	none	none	10	none	6.5 to 9	60	15 50

Bold values exceed Colorado standards for ground water discharge.

APPENDIX 7.0

CHAIN-OF-CUSTODY FORMS

Walsh & Associates, Inc.
Environmental Scientists and Engineers

CHAIN OF CUSTODY RECORD

5059

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name I-70/ Brighton Blvd

SAMPLERS: (Signature) Rob C. Sherman

Sta No	Date	Time	SOIL		Station Location	Sample Tag No.	RCRA 8 Metals	No. of Containers	Remarks
TH-24 (5-36.5)	5/13/98	1021	X		Baldwin Ct (5-36.5 ft)	55496	X	1	4oz glass
TH-25 (5-36.5)	↓	1300	X		Lambert Auto Electric. (5-36.5 ft)	55500	X	1	4oz glass

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Rob C. Sherman	5/13/98 1530	[signature] 15:50 5-13-98			
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks: Normal TAT; CDOT price	

Distribution: Original accompanies shipment. WALSH & ASSOCIATES, INC

Walsh & Associates, Inc.
Environmental Scientists and Engineers

Doberman = 111 443-3282 x111

CHAIN OF CUSTODY RECORD

3058

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name I-70/Brighton Blvd

SAMPLERS: (Signature) Rob Doberman for Dave Walker

Sta No	Date	Time	40V		Station Location	Sample Tag No.	RCRA-8 Metals	ICP	No. of Containers	Remarks
MW-4 TH-3	5/12/98	945	X		Composite (5-36.5)	66602	X		1	40z
MW-5 TH-3	↓	1200	X		Composite (5-36.5)	~~66607~~ 66606	X		1	"

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
[signature]	5/13/98 1530	[signature] 5-13-98			
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks: Normal TAT; CDOT Prices	

Distribution: Original accompanies shipment. WALSH & ASSOCIATES, INC

WALSH
Environmental Scientists and Engineers, Inc.

443-3282 X111

CHAIN OF CUSTODY RECORD

№ 8576

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name I-70/Brighton Blvd

SAMPLERS: (Signature) J. C. Berman

Sta No	Date	Time	S O I L	Station Location	Sample Tag No.	Total RCRA-8 Metals	No. of Containers	Remarks
GP-1	06/01/98	1015	X	Central Storage (1.9-2.9 ft)	55531	X	1	4 oz
GP-1 (1.9-10)		1040		" " (1.9-10.0')	55534	X	1	
GP-2 (3-10)		1156		" " (3.0-10.0')	55536	X	1	
GP-3 (4-10)		1251		" " (4.0-10.0')	32953	X	1	
GP-4 (2.5-10)		354		4401 E. 46th Ave. (2.5-10.0 ft)	32958	X	1	

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
J. C. Berman	06/01/98 1705	[signature]			
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:	

Distribution: Original accompanies shipment.

Environmental Scientists and Engineers, Inc.

CHAIN OF CUSTODY RECORD

№ 8220

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

P.M. Bob German

Proj. No. 3008-020 Project Name Brighton Blvd

SAMPLERS: (Signature)

Sta No	Date	Time	Station Location	Sample Tag No.	BTEX/MTBE	TVPH	TEPH	8270	8260							No. of Containers	Remarks
MW-1 TH-20	5/11/98	1015	~~30~~ MW-1 30ft	66593	X	X	X				1					1	
"		1030	MW-1 35 ft	66594	X	X	X				2					1	
"		1035	MW-1 Composite	66596				X			3					1	
MW-2 TH-19		1190	MW-2 5ft	66597	X	X	X				4					1	
"		1230	MW-2 30ft	66598	X	X	X				5					1	
"		1240	MW-2 Composite	66608				X			6					1	
"		1240	MW-2 Composite	66599					X		6					1	
MW-3 TH-7		1410	MW-3 5ft	66612	X	X	X				7					1	
"		1455	MW-3 30ft	66615	X	X	X				8					1	
"	↓	1500	MW-3 Composite	66614				X			9					1	

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
	5/12/98 0800				
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:	

Distribution: Original accompanies shipment. WALSH

Walsh
Environmental Scientists and Engineers, Inc.

CHAIN OF CUSTODY RECORD

4600 Pearl East Circle, Suite 103
Boulder Colorado 80301

P.2/2

P.M. Bob German

Proj. No. 3008-020 Project Name Brighton Blvd

SAMPLERS: (Signature) David R. Eckl

Sta No	Date	Time	Station Location	Sample Tag No.	Metals	No. of Containers	Remarks
TH-20 MW-1	5/11/98	1035	MW-1 Composite	66595	X	1	
TH-19 MW-2	↓	1240	MW-2 Composite	66609	X	1	
TH-21 MW-3	↓	1500	MW-3 Composite	66613	X	1	

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
David R. Eckl	5/12/98 0800	5-12-98 13:30			
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:	

Distribution: Original accompanies shipment. WALSH

MAY 12 '98 05:13PM ANALYTICA GROUP

Walsh & Associates, Inc.
Environmental Scientists and Engineers

443-3282 | 10 | 11 | 5060

CHAIN OF CUSTODY RECORD

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 | Project Name I-70/Brighton Blvd

SAMPLERS: (Signature) Robert C. Sherman

Sta No	Date	Time	Soil		Station Location	Sample Tag No.	8270	BTEX/MTBE	TVPH	TEPH	WASH LAB I.D.					No. of Containers	Remarks
TH-24 (5-6.5')	5/13/98	0905	X		Baldwin Ct (5-6.5')	55495		X	X	X	1					1	4oz glass
TH-24 (25-31.5)		1010	X		" " (25-31.5')	55497		X	X	X	2					1	" "
TH-24 (5-36.5)		1022	X		" " (5-36.5)	55498	X				3					1	" "
TH-25 (5-6.5)		1155	X		LAMBERT Auto Electric (5-6.5)	55499		X	X	X	4					1	" "
TH-25 (5-36.5)		1300	X		" " (5-36.5)	55501	~~X~~ DUP				5					1	" "
TH-25 (25-31.5)		1240	X		" " (25-31.5)	55502		X	X	X	6					1	" "

hdd.

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Robert C. Sherman	5/13/98 1530				
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:	
			5/13/98 1559		

Distribution: Original accompanies shipment. WALSH & ASSOCIATES, INC

Walsh & Associates, Inc.
Environmental Scientists and Engineers

CHAIN OF CUSTODY RECORD

0001

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

98-5-11 Due 5/27/98

Proj. No. 3008-020
Project Name I-70 / Brighton Blvd

SAMPLERS: (Signature) [signature] for Dave Walker

Sta No	Date	Time	Soil		Station Location	Sample Tag No.	BTEX/MTBE	TVPH	TEPH	8260	8270						No. of Containers	Remarks
TH-22 MW-4 RC	5/12/98	0900	X		Western Boom North (10')	66600	X	X	X				1				1	4oz
MW-4	↓	0930	↓		" " " (30')	66601	X	X	X				2				1	"
MW-4	↓	0945	↓		" " " (5-36.5')	66604					X		3				1	"
MW-4	↓	0945	↓		(5-36.5')	66603				X			3				1	"
TH-23 MW-5 RC	↓	1110			OJ Valentine (5)	66605	X	X	X				4				1	"
MW-5	↓	1145			" " (30')	63609	X	X	X				5				1	"
MW-5	↓	1200			" " (5-36.5)	63608					X		6				1	"

RLY

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
[signature]	5/12/98 1600				

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)

Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:
		[signature]	5/12/98 1600	Normal TAT; CDOT price

Distribution: Original accompanies shipment. WALSH & ASSOCIATES, INC

Walsh
Environmental Scientists and Engineers, Inc.

Bob German = PM 40-00-01

CHAIN OF CUSTODY RECORD

№ 8511

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name I-70 / Brighton Boulevard

SAMPLERS: (Signature)

Sta No	Date	Time	Soil		Station Location	Sample Tag No.	BTEX/MTBE	TVPH	TEPH	8260	8270	Lab ID					No. of Containers	Remarks
GP-1	06/01/98	1015	X		Central Storage (1.9-2.9 ft)	55532	X	X	X			1					1	4
GP-1		1040			(1.9-10.0 ft)	55533	X	X	X			2					1	
GP-2		1156			Central Storage (3-10')	55535	X	X	X			3					1	
GP-3		1251			Central Storage (4-10')	32954	X	X	X			4					1	
GP-4		1354			4601 E. 46th Ave. (2.5-10')	32955				X		5					1	
GP-4		1354			4601 E. 46th Ave. (2.5-10')	32957	X	X	X								1	
GP-4		1354			4601 E. 46th Ave. (2.5-10')	32956					X						1	

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
[signature]	06/01/98 1540				
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks:	
		[signature] WA SH	06/01/98 16:40		

Distribution: Original accompanies shipment.

Environmental Scientists and Engineers, Inc.

CHAIN OF CUSTODY RECORD

№ 8483

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

98-05-08

Proj. No. 3008-020 Project Name I-70/Brighton Blvd.

SAMPLERS: (Signature)

Sta No	Date	Time	H_2O	Station Location	Sample Tag No.	TVPH	TEPH	Walsh #	No. of Containers	Remarks
TH-16	5/8/98	1050	X	Central Storage	64496, 497	X		1	2	HCl 40ml
TH-16		1055		" "	64499		X	1	1	1-L Amber
TH-18		1205		OJ Valentines	64502		X	2	1	1-L Amber
TH-18'		1208		" "	64500, 501	X		2	2	HCl, 40ml
TH-10		1410		" "	55494		X	3	1	1-L Amber
TH-10	↓	1419	↓	" "	55492, 493	X		3	2	HCl, 40ml

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
[signature]	5/8/98 1745				
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks: CDOT 14 day TAT	
		[signature]			

Distribution: Original accompanies shipment. WALSH

WESTON
Environmental Scientists and Engineers, Inc.

98-05-33
CHAIN OF CUSTODY RECORD

No. 8503

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name I-70 / Brighton Blvd

SAMPLERS: (Signature) Joe C. Berman

Sta No	Date	Time	1&0		Station Location	Sample Tag No.	8260	TVPH	TEPH		Walsh Lab ID						No. of Containers	Remarks
TH-24	05/26/98	1115	X		Baldwin Ct	55504, 505	X	X			1						2	HCl; 2-40ml VOA
TH-23		1303			OJ Valentine	55507, 508	X	X			2						2	HCl, "
TH-20		1400			Central Storage	55512, 513	X	X			3						2	HCl, "
TH-19		1458			Central Storage	55515, 516	X	X			4						2	HCl, "
TH-22		1625			Western Boom	55519, 520	X	X			5						2	HCl, "
TH-21		1715			Western Boom	55523, 524	X	X			6						2	HCl, "
TH-25		1413			Lambert Auto	55528, 529		X			7						2	HCl, "
TH-24		1106			Baldwin Ct.	55506			X		8						1	Cool
TH-23		1300			OJ Valentine	55509			X		9						1	Cool
TH-20		1358			Central Storage	55514			X		10						1	Cool
TH-19		1500			Central Storage	55517			X		11						1	Cool
TH-22		1620			Western Boom	55521			X		12						1	Cool
TH-21		1710			Western Boom	55525			X		13						1	Cool
TH-25	↓	1815	↓		Lambert Auto	55530			X		14						1	Cool
						RLG												

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Joe C. Berman	05/26/98 1956				
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks: Normal TAT; CDOT Project	
		Dongjin Dai WALSH	5/27/98 12:50		

Distribution: Original accompanies shipment.

Walsh
Environmental Scientists and Engineers, Inc.

Bob German = , , M.
443-3282

CHAIN OF CUSTODY RECORD

№ 8502

4888 Pearl East Circle, Suite 108
Boulder Colorado 80301

Proj. No. 3008-020 Project Name. I-70 / Brighton Blvd

SAMPLERS: (Signature) Robert C. German

Sta No	Date	Time	H_2O		Station Location	Sample Tag No.	RCRA-8 Metals Total Dissolved	No. of Containers	Remarks
TH-24	05/26/98	1127	X		Baldwin Ct.	55503	X	1	field filtered HNO_3
TH-23	↓	1314	↓		OJ Valentine	55510	X	1	a.a.
TH-20		1407			Central Storage	55511	X	1	a.a.
TH-19		1508			Central Storage	55518	X	1	a.a.
TH-22		1636			Western Boom	55522	X	1	a.a.
TH-21		1733			Western Boom	55526	X	1	a.a.
TH-25	↓	1826	↓		Lambert Auto	55527	X	1	a.a.

Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Robert C. German	05/27/98 1239	5-27-98 12:39			
Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)	Relinquished by: (Sign.)	Date/Time	Received by: (Sign.)
Relinquished by: (Sign.)	Date/Time	Received for Laboratory by: (Sign.)	Date/Time	Remarks: Normal TAT COOT Project	

Distribution: Original accompanies shipment. WALSH

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Omaha, Nebraska 68114
Phone (402) 393-1010 FAX (402) 393-1651